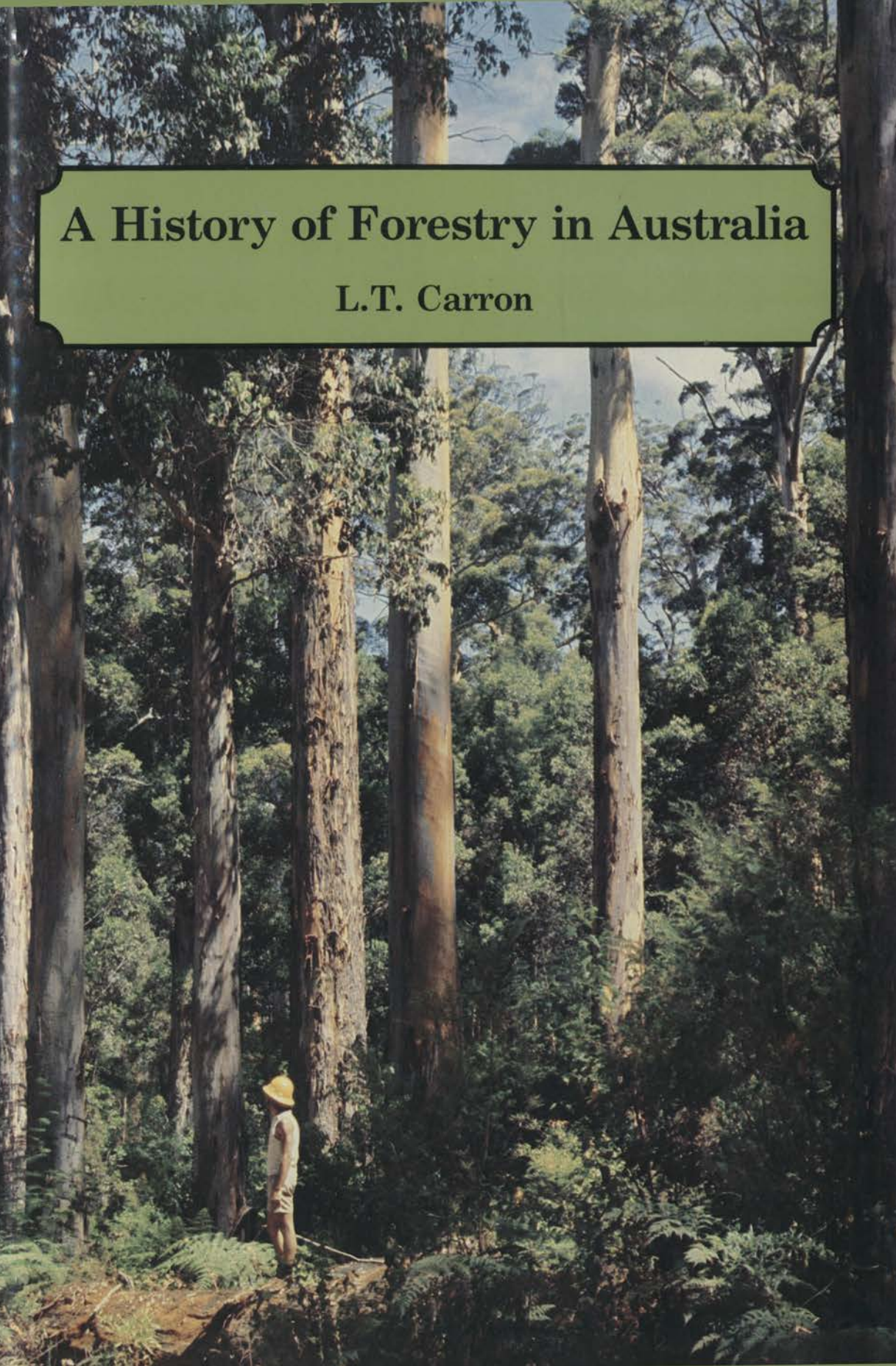
A History of Forestry in Australia

L.T. Carron



A History of Forestry in Australia

Forestry is the wise and sustained fostering, production and use by people of the many values, benefits and products of forests. The development of forestry in Australia in this sense, from first settlement by Europeans in 1788 to the end of the 1970s, is outlined in this book.

At political federation in 1901, the State Governments retained responsibility for, and authority over, the forests within their borders. However, the powers they ceded at Federation and since have enabled the Commonwealth Government to increase its influence over the whole forestry sector. The federal system of government has thus complicated what might otherwise have been a simple history of forestry in each state, and, in keeping with these circumstances, *A History of Forestry in Australia* is structured around the development of forestry in each state, the role of the Commonwealth, and Commonwealth–State integration.

Until the 1960s, few people outside the forestry profession or the forest-based industries were particularly interested in forestry in Australia. Most people tended to take forests and forestry projects for granted. But, with the wave of concern for 'conservation of the environment' which began to gather force around that time, many people began to take a critical, personal interest in the forest estate, its management and managers. Therefore, Dr Carron pays extra attention to some of the more controversial public issues of the 1970s.

A History of Forestry in Australia has been written with a number of aims. One is to provide the professional forester and student with a history of Australian forestry. At the same time, it is directed beyond the profession – to historians, politicians and conservationists, and all people with an interest in the historical development of this important land use.

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To Peg,
Beverley and Philippa

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Preface

There are many definitions of 'forestry'. They all relate, in one way or another, to the wise and sustained fostering, production and use by man of the many values, benefits, services and products of forests. I have tried in this book to outline the development of forestry, in this sense, in Australia, from the time of first settlement by Europeans in 1788 up to the 1970s. In doing so I have had several aims. One aim is to provide, for members of the forestry profession and those preparing to enter it, an historical background to Australian forestry — a chronicle of who did what, when and where, and, to the extent that it is recorded or can be reliably guessed at, why. Most members of any profession at some stage or another develop a sense of curiosity about the source and history of their professional sub-culture, about the traditions they have inherited, and Australian foresters, with a century of forestry behind them, are demonstrating in various ways that this stage has now been reached. Except for Rule's *Forests of Australia*, which outlines some of the history of forestry within a general discussion of the forest resource, forestry and forest-based industry of today, no reference is available for this purpose.

At the same time, the text is directed beyond the profession. Until the 1960s, few people outside forestry or the forest-based industries appear to have had much interest in forestry in this country. The vast majority tended to take forests and forestry products for granted. But, with the wave of concern for 'conservation of the environment' which started to gather force around that time, many people began to take a critical, personal interest in the forest estate of Australia, its management and its managers. That interest has intensified during the past decade and there is now a wide range of opinion about how the forest resource should best be managed. Indeed, there is every indication that, during the next decade, expressions of opinion will get stronger and the division of opinion will be widened. I am firmly of the view (though perhaps unduly optimistic) that the most satisfactory resolution of this division of opinion and the most satisfactory planning for the future will come, not from the sort of confrontation that has been an unhappy feature of the past decade, but from reasoned discussion amongst reasonable people, and that an apprecia-

tion of the historical course that forestry has followed (for good or bad reasons), on the part of everyone involved in that discussion, is essential to reason and reasonableness in it.

People of other countries with an interest in Australian forestry today may also find an historical background to it of value.

I hope, too, that what I have written will form a memorial, however slight, to a great many people who have through forestry given dedicated public service, in the widest sense, to this country.

There are difficulties in writing such a history for Australia. One difficulty arises from the political structure of the country. Until political federation in 1901, what is now referred to as Australia was composed of a number of colonies going their individual ways. At Federation, these colonies became states of Australia, each with its own government, each retaining some of its former powers but surrendering others to the new Commonwealth Government. Amongst the powers the State Governments retained was control of the land within their borders and the forests on it. But powers they ceded at Federation and since have enabled the Commonwealth (Australian, Federal, National) Government to exert an important influence on forestry and the forest-based industries (a combination often referred to loosely as 'the forestry sector') within the states.

Thus, political federation has considerably complicated what might otherwise have been a simple, separate historical development of the forestry sector in each state by establishing three sources from which matters of interest to forestry and the forest-based industries arise and three areas of interaction between these two interdependent parts of the forestry sector and the two tiers of government. Firstly, because of its authority over, and responsibility for, land, each State Government has developed its own forest policy and has established a bureaucratic organisation to implement it. Each State Government also exerts appropriate influence over forest-based industries within its state boundaries. Secondly, the Federal Government exerts an indirect influence over the State forestry organisations, through their governments, by virtue of its control over the disbursement of funds to those governments, and it exerts a direct influence on the forest-based industries of the states through its responsibility for national administration of taxation, overseas trade, quarantine, and the like — matters about which it may or may not consult the State Governments and with which they variously may or may not concur. Thirdly, there are also views and courses of action with respect to the forestry sector that the Commonwealth Government proposes to the State Governments and are agreeable to them, and views and courses of action which the State Governments promote and are agreeable to the Commonwealth Government. These may well be described as elements of 'national' policy, but they may be implemented to a different extent and in different forms in the various states.

Thus, since 1901, the State and the Commonwealth Governments have pursued both independent and cooperative ways. In trying to accommodate to this complexity, I have thought it best to discuss, for each state separately, the development of forestry under the main influence of its government; to discuss separately the role of the Commonwealth; and to discuss, again separately, the interaction of the State and Commonwealth Governments in the collective, coordinated or integrated 'national' sense. This makes for some repetition, but less, I think, than in any other form of treatment. The colonies were founded, achieved separation, gained responsible government and established formal forestry institutions at different times, so that there are several bases on which one might establish an order of priority in discussing the states. It has seemed simplest to discuss them in the order of their dates of first permanent settlement; that is, New South Wales (1788), Tasmania (1803), Queensland (1824), Western Australia (1829), Victoria (1834), South Australia (1836). It has also seemed simplest to use the names of the present states, and the term 'Australia' for the whole continent, as if these applied from the time of first settlement.

Another difficulty in writing such a history arises from the nature and location of the primary sources. Since forestry in Australia has been for the most part the responsibility of government departments, much of the story of its history lies within (though all too often between) countless pages of countless files, usually not readily accessible, in many parts of this large continent. Because of constraints of time and money, I have had to resort more to reports, inquiries and the like for information. In doing so I recognise that the original material, although conveniently digested in this way, may also have suffered some form of transformation. I have tried to allow for this.

Most of the contents of this work is in the area of policy and administration, with less emphasis on the scientific and technological development, because the main thrust and shape of forestry derives from the former and because I have written a history of the latter elsewhere (A history of forestry and forest products research in Australia, *Historical Records of Australian Science*, 5(1), Australian Academy of Science, 1980). I have also been content to provide what is mainly a chronicle of events because I think this is a necessary prelude to the analytical history that I hope will be provided by someone with more skill in historiography. In doing so I have tried to be objective, knowing that complete objectivity is unattainable. Even the selection of material is open to bias; but, though I almost certainly have unconsciously done so, I have not deliberately included or excluded material to present a personal interpretation or view. Nevertheless, one bias is likely to show, for which I make no apology. More than forty years in the forestry profession have convinced me

that it is honest, earnest, hardworking and altruistic to a great degree, with an enormous record of achievement in spite of frequent political opposition and public apathy in the early days. My choice of material and method of presentation no doubt reflect that view. Whereas many modern environmentalists may well find this list of virtues deficient in other respects, these characteristics have been a major influence in ensuring that there is at least a forest estate in this country for them to haggle about. I have high hopes that the near future will provide conditions for more creative thinking and for the application of more imaginative practice, both of which will be essential to the resolution of conflicts about the environment, of which forestry will obviously become an increasing source.

Because forestry is as much about the practitioners as it is about the practice, I am well aware that a mere narrative of events, with little about the people who initiated, influenced, controlled or performed them, lacks the colour of good history. I fully appreciate this deficiency in this book, but I know I would do less than justice to that aspect without a much longer opportunity for research and access to more extensive sources of information than have been available to me. I have been witness to many of the events of the past several decades and a participant in some of them. I have found that the official records, which have been my major source of information, often deal so inadequately with the people and their involvement in those events with which I am closely familiar that I am discouraged from making interpretations and judgements in cases outside my knowledge from the official records alone. I have therefore thought it both unfair and unwise to refer to people in other than a formal and impersonal way. This is a situation I regret, for it has been my fortune to have had some association with many of the members of the forestry profession born within the last hundred years, and to have had a close association with a number of those born this century whose personal or professional traits have had considerable influence on major events during the period I have surveyed. The temptation to try to provide some colour from this source is strong but it would, I know, be a distorted picture. I am sure later historians, knowing nothing about the people involved, will find writing about them and their influence immeasurably easier.

I have found it difficult, in a text intended as an outline of the historical development of forestry in Australia from its beginnings to the present, to prevent the material of the 1970s seeming too disproportionate to the rest, but the injection of public interest in forest policy, and the manner of its implementation, during this past decade has had the effect of making forestry the subject of more issues, conflicts and inquiries during this period than all those of the many years preceding it. This change in the status of forestry has also necessitated a change in my style of presentation from a chronological narrative of events up to the 1970s to one of separate definition and

discussion of the more important aspects of forestry activity of this recent period.

Several colleagues were kind enough to peruse the manuscript and offer suggestions for its improvement; to them I am grateful. They are of course in no way responsible for its errors and shortcomings. I am particularly indebted to Mrs M. Harmey for a great amount of invaluable work in searching out material and typing manuscripts. I am also in debt for many courtesies from libraries of the Australian National University (especially its Department of Forestry), CSIRO Division of Forest Research, the State forestry organisations, the Australian War Memorial and the National Library of Australia.

Abbreviations

ACF	Australian Conservation Foundation
ACT	Australian Capital Territory
AFC	Australian Forestry Council
AFDI	Australian Forest Development Institute
AGPS	Australian Government Publishing Service
AIF	Australian Imperial Forces
ANM	Australian Newsprint Mills Limited
ANU	Australian National University
ANZAAS	Australian and New Zealand Association for the Advancement of Science
APM	Australian Paper Manufacturers Limited
APPITA	Australian (and New Zealand) Pulp and Paper Industry Technical Association
APPM	Associated Pulp and Paper Mills Limited
AUSTIS	Australian Timber Industry Stabilisation
BEF	British Expeditionary Force
CSIR	Council for Scientific and Industrial Research
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CTRC	Conservation Through Reserves Committee
EPA	Environment Protection Authority
ESTIS	Eastern States Timber Industry Stabilisation
HRA	Historical Records of Australia
HRNSW	Historical Records of New South Wales
IFA	Institute of Foresters of Australia
RSSS	Research School of Social Sciences, ANU
SAPFOR	Southern Australia Perpetual Forests Limited
sup.(s.)ft.	superficial feet
TPFH	Tasmanian Pulp and Forest Holdings Limited

CHAPTER 1
New South Wales

The First Settlement

Historians have advanced many reasons for the decision of the British Government in 1786 to establish a colony at Botany Bay on the east coast of New Holland.[1] If the commercial potential of the enterprise was a major motive, as some suggest, it could hardly have been centred on the forest resource, for neither Cook's nor Banks' reports sustained that as a possibility. Certainly His Majesty's instructions to Governor Phillip required that, in allotting lands to emancipated convicts, he should reserve 'to us such timber as may be growing or to grow hereafter upon the said land which may be fit for naval purposes',[2] but this was a logical precaution for any maritime nation continually on the lookout for a source of ships timbers, especially for the repair of ships at the end of a seven months' journey from their home base.

But if the supply of timber was not a primary reason for founding the settlement, it was of major interest to the settlers, whose early need in the new land was for shelter, and, to this end, His Majesty's Government could have served the Governor better. Despite the suggestion of Lord Sydney, Secretary of State for the Home Department, that 'as many of the marines as possible should be artificers such as carpenters, sawyers', in the event, the source of building and carpentry skills in the First Fleet was pitifully limited. The few tools were also more suited to the oak, beech and conifers of the northern hemisphere, and the fine cabinet woods (such as mahogany and walnut) which England drew from around the world, than to the trees of a 'hard and ponderous nature', as Cook had described them, in the new country. Phillip recorded with obvious feeling his reaction to the intractability of many of the eucalypts (for which we have still not found a solution):

> The timber of the site is well described in Captain Cook's voyage but unfortunately it has one very bad quality which puts us to very great inconvenience: I mean the large gum-tree which splits and warps in such a manner when used green, to which necessity obliged us, that a storehouse boarded up with this wood is rendered useless. The timber

> which in its growth resembles the fir tree warps less but we are obliged to fetch it from some distance and it will not float.

The natives, he thought, contributed to the problem:

> they are so frequently setting the country on fire is I apprehend the reason we find so little timber is sound. It must injure the very young trees which it does not destroy and so very scarce is the sound timber which is proper for masts that there has been some trouble to get the *Supply* masted.[3]

This was in striking contrast with Norfolk Island, which Lt. King described as:

> one entire wood . . . the pine trees rise fifty and sixty feet before they shoot out any branches. I apprehend H.M. ships in the East Indies may be supplied from this island with masts and yards which will render it a very valuable acquisition.[4]

Surgeon-General White was also little enamoured of the local timbers. After six weeks in the colony he wrote:

> the timber of this country is very unfit for the purpose of building: nor do I know any one purpose for which it will answer except for firewood and for that it is excellent; but in other respects it is the worst wood that any country or climate every produced.[5]

However he did find some compensation in the essential oils from *Eucalyptus piperita*, which were 'efficaceous in removing cholicky complaints'.[6] To the pitsawyers and carpenters of the new settlement, the discovery of the soft and tractable cedar (*Toona australis* syn. *Cedrela australis*) in early explorations around the Hawkesbury River was a god-send. As 'red-gold' it was to play as big a role in the exploration and development of the colony as mineral gold was to do seventy years later.

The effects of the long voyage from England on aging wooden ships placed many of them in need of repair at Sydney Cove and, despite problems with their use, local timbers were pressed into this service from the time of arrival of the First Fleet. But it was not until November 1791 that Phillip sent a formal despatch of wood to England on board the *Gorgon*,[7] which Secretary Stevens acknowledged in July 1792 and advised that 'trials will be made of their qualities'.[8] The results must have been satisfactory for in 1798 the Duke of Portland asked Governor Hunter to investigate the possibility of supplying timber for maritime and other purposes to the Cape of Good Hope, where it was scarce. No doubt prompted by the submission of ex-Governor Hunter, who extolled the virtues of the

local trees for ships timbers in a lengthy description to Under-Secretary King in 1802,[9] the Admiralty in that year ordered that HMS *Glatton* and other ships for conveyance of convicts to the colony should bring home as much timber as possible, owing to the scarcity of timber in England, and every opportunity was to be taken for procuring it for His Majesty's Dockyards.[10] In fact it was intended that the *Glatton* should return fully loaded with such timbers, but King had inadequate advice of this and worked hard in the month between the *Glatton*'s arrival and departure in 1803 to get together about 160 pieces covering a wide range of dimensions and species (black gum, ironbark, mahogany, stringybark, blue gum, box and lignum vitae).[11]

Phillip had been instructed that:

> every sort of intercourse between the intended settlement at Botany Bay or other place which may be hereafter established on the coast of New South Wales and its dependencies, and the settlements of our East India Company, as well as the coast of China, and the islands in that part of the world . . . should be prevented by every possible means.[12]

However, this could not be taken too literally by a colony that was dependent to a large extent on imports for its survival; and East India Company merchants, who were the major source of supplies to the colony and wanted return freight for their ships as well as a guarantee of payment for their goods, saw timber suitable for naval stores for their ships as a possible export.[13] Matthew Bampton, owner of the *Experiment*, was therefore permitted by the Administrator, Captain Paterson, in March 1793:

> to take a cargo of mahogany and cedar of this country in the hope that if it should prove valuable in India it may be of advantage to this major interest in any future intercourse with that country which may be directed by the Government.[14]

It was an ironic choice of ship, for the 'experiment' was apparently quite unsuccessful financially and was not repeated.

The Next Hundred Years

For the next hundred years, the forests of the colony suffered a gradually increasing attack from two quarters. In one quarter, the forest was seen as an inexhaustible source of wood for local or export needs. Successive governors and governments over this period produced a series of orders, rules and regulations regarding the cutting of trees on crown lands. An order in 1803 by Governor King, exceptionally enlightened for the time and circumstances, expressed concern at the erosion occurring along the Hawkesbury River as a result of indiscriminate cutting and forbade the cutting of any tree or

shrub growing 'within two rods' of the edge of the bank.[15] Apart from this, the regulations were aimed entirely at ensuring supplies for government purposes or providing revenue. In 1795, Governor Hunter introduced regulations concerning cutting along the Hawkesbury River. In 1801, a government order declared 'coals and timber which are to be procured at Hunter's River to be the exclusive property of the Crown', the cutting of which required a special licence;[16] and, in 1802, the felling of cedar on the Hawkesbury River without permission was proclaimed illegal.[17] By 1820, timber-getters not only needed permission to operate but the quantity they could cut was specified. A continuous series of regulations, particularly in 1839 and 1850, which vested authority in Crown Lands Commissioners and local magistrates to grant licences for cutting and removal of timber from vacant crown lands for a fee to persons of good character, reinforced the intention of the Crown to exercise some control over cutting as well as provide much needed revenue. However, with a small staff in a big country, there was in fact little element of control of the implementation of the regulations.

> In no instance did . . . [they] . . . deal with matters beyond the size and description of trees to be cut and the terms and conditions for the cutting and removal of the timber. The licensee . . . was practically left to do as he wished in the forest. He felled what trees he liked, removed what pleased him, and left on the ground to rot what did not suit him.[18]

In the other quarter, a people in need of food, either for local use or as a source of exports, saw the forests only as an impediment to the cultivation of the soil and the grazing of domestic animals — the heavier the forest, the better the soil. There are very few countries in which the indigenous forests have not had to give way to the axe and the match for the production of food, and Australia was no exception. How much forest cover was removed during this period is not known, and there is little evidence on which to base more than an intelligent guess. In a world more resource-conservation minded, it is easy now to criticise the practices of those times, but there is so much of discredit in our catalogue of present land-use that we are in no position to condemn our forebears. In Australia, as in most countries, the key to social development lay in the soil; where trees were an impediment to use of the soil, it was understandable they should be removed.

The First Reservations and the First Director-General of Forests

However, by 1870 there was sufficient concern in some influential quarters that the poorly controlled cutting of trees on crown lands and the indiscriminate removal of forest on crown lands alienated to

leasehold and freehold would soon leave no land for permanent production of wood for moves to be made in Parliament towards the establishment of permanent reservations, and in 1871 reserves were gazetted in the Murray and Clarence River districts. If, as M. R. Jacobs has said, 'Forestry can be said to start in a country when the people make a deliberate effort to conserve, regenerate or plant forests',[19] then the first step for forestry in Australia could be said to have been taken in that year — though it was a tentative step.

It was not until 1875 that special officers to supervise the reserves were appointed, one of them being William Carron (a survivor of Kennedy's expedition to Cape York in 1848), who, as Collector of the Botanic Gardens, had reported on existing reserves and recommended others. He was made 'inspector of forests and forestry ranger for the Clarence River district'.[20] It was another forty years after the establishment of these first reservations before the important step was taken to set up a government authority to carry out a policy of forest conservation, backed by appropriate legislation. It was a tentative step indeed, for, in the words of the Royal Commissioners of 1908, during that forty years:

> probably no section of business under Government control has experienced greater vicissitudes in management or less consideration than that connected with our forests. No attempt appears to have been made to lay down a policy of management and apparently as each responsible department became tired of the business, or failed to succeed with it, it was passed on to another. . . . The protection of the forest domain appears to have been nearly always subordinated to the policy of settlement.[21]

In late 1876, a small branch of the Lands Department, called the Occupation of Lands Branch, was formed to administer the regulations under the various Lands Acts relating to the reserves. In 1878, the direction of this Branch was transferred to the Department of Mines and in March 1882 it was converted into a Forest Conservancy Branch — what might well be taken as the birth of today's Forestry Commission.[22] It was transferred back to the Lands Department in 1888; made a Department under the Colonial Secretary in 1889; transferred back to the Mines Department in 1892; and re-established as a Branch of the Lands Department in 1897.[23] It had experienced, in the words of a later departmental head, 'an existence of some vicissitudes, struggling through official apathy and want of public recognition'. Its duties were:

> first, carrying out the provisions of Part VI of the Crown Lands Act of 1884 as amended 1889 which provides for making State Forests and regulating the felling of timber, quarrying of stone, removal of clay, shells, etc. on State forest, timber reserves and Crown lands; second,

> the establishment of nurseries and plantations of timber trees, thinning out useless trees on timber reserves; third, carrying out of provisions of the Prickly Pear Destruction Act of 1886. The forest rangers also inspect timber on Crown lands and report to the local Land Boards upon application for permission to ringbark . . .[24]

In 1881, the poet Henry Kendall was made Inspector of State Forests by (Sir) Henry Parkes, then Premier and a friend of long standing.[25] Kendall had an obvious feeling for the bush, a knowledge of it, and a practical association with it, from some years of employment in the timber industry in various parts of the state 'but was hardly a suitable person to establish a Government Department in New South Wales'.[26] 'Exposure attendant on long journeys through the bush broke down his already weak frame, tubercular disease followed and he died . . . in 1882'.[27] He was succeeded by John Duff, who 'made a creditable attempt to establish experimental plantations and to improve native forests by ringbarking useless trees'.[28]

Despite the lack of policy, legislation or forest management, at least the reservation of land for forestry purposes went on, so that by 1881 there were 461 reserves totalling nearly 1.5 million ha. By 1888 there were 2 million ha in about a thousand reserves. It was about this time too that, in addition to a nominal fee for registration purposes, the payment of royalty for forest produce was introduced — a matter which has loomed large in the history of New South Wales forestry to the present day.

In 1889, Premier Parkes invited J. Ednie Brown to be the first Director-General of Forests. He began his duties on 1 July 1890. Brown had the distinction of being chief officer of three government forestry organisations in Australia. He had previously been the first Conservator of Forests in South Australia and was later to become the first Conservator of Forests in Western Australia. Jacobs describes him as 'a Scottish forester who had already achieved some renown and who had had experience in America' and pays tribute to Brown's successes in afforestation in South Australia.[29] Lewis describes him as a 'man of energy and intellect . . . a very able writer' and refers to his fellowship of the Linnean Society and arboricultural awards.[30] 'Cognitor', in the Australian Forestry Journal of 1921, expresses the contemporary critical attitude of the 'professionally' trained towards the 'non-professional':

> in 1889 the Government of the day, with rather a flourish of trumpets, established a Department of Forestry and under the title of 'Inspector-General of Forests' appointed a trained nurseryman to take charge of it. This departure failed to provide any measure of success in forest conservation or management mainly because a trained forester in place of a nurseryman was required and its principal results were the publication of voluminous reports on the subject of Forestry and the

> useless expenditure of considerable sums of money on ill-directed schemes of planting and administration. Indeed, it did more harm than good, because, for reasons that need not be here entered into, it led to public contempt and ridicule. It is not therefore surprising that in less than five years time it ended with the dismissal of the Inspector-General and the relegation of the Department to a branch of the Public Service, as it had been once before.[31]

D. E. Hutchins expressed a similar 'professional' condemnation of Brown's work in South Australia.[32] Yet Brown's first report as Director-General contains notes on the value of forests, which, with the exception of his views that 'forests attract rain clouds' so that afforestation would increase the rainfall of inland New South Wales, can hardly be faulted eighty years later; eminently sensible recommendations for much needed forestry legislation; arguments for a School of Forestry in New South Wales, still being proposed by professional foresters thirty years later; and detailed descriptions of wattle cultivation, the cedar forests, the Murray River forests and afforestation in various parts of the state. Indeed, it was a most impressive report for someone who had been in a new and controversial office barely fourteen months and particularly appropriate in the circumstances of the times. He realised that legislation was essential to proper control of the forests, and his report of the following year echoed his disappointment that the proposed Bill had not yet been brought before Parliament.[33]

A Difficult Decade

The last decade of the nineteenth century was one of the most eventful in the history of New South Wales. Like most of Australia at some time or other over these years, it suffered from economic depression, industrial strife, drought and rabbits, saw the beginnings of great social and political reform, and experienced the intense political activity that culminated in the federation of the colonies.

> It was characterised by a pronounced hostility to forestry and in no other period was so much real damage done to the forests as at this time. The question of timber preservation was hardly given a moment's consideration and schemes of settlement were feverishly put forward to defeat it. It appeared almost like an effort by the opponents of forestry to finally destroy its claim for further consideration.[34]

The lack of effective control of cutting on crown forests and the continued alienation of them for settlement were readily apparent to officers of government departments deprived of the local supply of some of the finest hard timbers in the world. A suggestion by the Western Australian Government that the Board of the New South Wales Department of Public Works might include Western Australian

timbers in future works specifications was salt in already sensitive wounds, and they used this as an opportunity to bring to the attention of the Minister the serious position of supply of New South Wales timber for government purposes. A conference of relevant government officers was appointed by the Governor in 1906. It noted the increasing difficulty, delay and cost of supply of hardwoods for government purposes because of 'the want of better legislation to deal with the conservation of timber, the depletion of the forest lands close at hand, clearing for settlement, largely increasing export trade, primitive methods of haulage, the prevention of reproduction by fire'. It recommended increased reservation, especially along the north coast railway, an inventory of present reserves, permanent dedication of reserves, the establishment of a forestry authority operating under appropriate legislation, encouragement of marketing of timber from leasehold and freehold land, assessment of adequate royalty, reservation of crown land for hydrological purposes, and legislation to prevent removal of forests on lease or freehold 'where it is determined in the public interests that forests be preserved for climatic, water conservation or other reasons'.[35]

The government responded to the increasing public disquiet and pressure by announcing a Royal Commission on Forestry in July 1907 with sweeping terms of reference:[36]

(i) Timber resources of the State.
(ii) Whether the present forest dues are fair and reasonable, and, if not, to report what dues should be charged.
(iii) The extent and value for forestry purposes of the existing reservations and nurseries, and whether these reservations and nurseries should be reduced or increased.
(iv) Afforestation and reafforestation, and what steps should be taken in this direction, with approximate statement of cost involved.
(v) Effectiveness or otherwise of the present forestry laws, with suggestions for necessary amendments or further legislation.
(vi) The present system of administration in all its phases and methods, including cost and the efficiency and effectiveness of the staff, and any changes that appear desirable.
(vii) Provision for education in science of forestry.
(viii) Whether any restriction should be placed upon the export of any classes of timber.
(ix) Whether the present system of shipping certificates, provisional certificates, and collection of inspection fees should be continued; if so, whether the system is satisfactory; if not, to suggest a remedy.
(x) And any other subject pertinent to such inquiry.

The Royal Commissioners were most diligent in their search for evidence and information: they reported travelling '8500 miles by

train, 3700 by coach, 400 by steamer and launch, 316 on horseback and about 400 on foot'; they visited South Australia, Victoria and Queensland; they held 374 meetings and heard 558 witnesses. Their findings and recommendations must have seemed eminently satisfactory to anyone with the interests of forestry at heart, including as they did:

> the withdrawal of the control of the forest reserves from the Department of Lands; the framing and passing of a Forestry Act; the appointment of three Commissioners to administer the Act and control the forests; the appointment of a Conservator of Forests; ... the ultilisation of the facilities afforded at the Technical College, the Agricultural College and the University, as the basis of a system of education in the science of forestry.

However, there was considerable disappointment at the government's response to the report. The Forest Act of 1909 which followed, though 'a step in the direction of forestry reform',[37] was a much weaker piece of legislation than had been proposed. Although it was given a Director, Forestry was still a sub-department (under Agriculture); the leasing of forest land remained under the Crown Lands Act; and there was inadequate financial provision for afforestation, reforestation and forest treatment, particularly for the encouragement of regeneration, for which techniques were rapidly becoming available.[38]

The Forestry Acts of 1916 and 1924

Throughout this period, responsibility for forestry in New South Wales was in the hands of R. Dalrymple Hay, who was to head the government organisation for thirty years. A surveyor with the Department of Lands, Hay was appointed Acting Chief of the Forestry Branch in 1896 and Chief Forester in 1904. 'Cognitor' appears not to have been upset at Hay's lack of professional qualifications, as he was in the case of Brown. He saw Hay as 'an officer, who, without knowing a great deal about the principles of Forestry knew something about the native forests, and, while possessed of commonsense and business ability, was enthusiastic on the question of conservation'.[39] R. Kaleski described him as a 'young surveyor who had become a keen advocate for forest preservation ... a student of native silviculture who possessed a large fund of commonsense and organising ability as well as intense energy and enthusiasm for the work'.[40] The Royal Commission gave him:

> credit for initiating and carrying out, in the face of great difficulties, much useful work, and by his protests, fearlessly put forward in the interests of forestry, he has been the means of delaying alienation of, and preserving for present and future use, many of the best hardwood forests in the State.[41]

Hay continued to 'fearlessly put forward' his protests in his annual reports. In 1912–13 he summarised the forestry position as 'one calling for thoughtful consideration and perhaps a little plain speaking' and referred to the administration of timber matters as hampered by political issues, the forest resources as imperilled by financial neglect and the forest laws as inadequate for effective management.[42] He must be remembered, too, as originating the Interstate Forestry Conferences. He chaired the first in Sydney in November 1911 and attended all seven that were held up to the end of his service. In the eyes of his first cadet forester, E. H. F. Swain, whom he appointed on 18 June 1899,[43] Hay got full marks for his fight for forest reservations: 'he did, heroically, a great pioneering job. But concerned for revenue and staff status, he had no instinct for forest management policy' — for which we may read 'forest management', because Hay's reports show a very good 'instinct' for forest 'policy'. He chafed continuously under the restrictions of the 1909 Act, which the enlightened recommendations of the Royal Commissioners would have freed him from, and in his 1913–14 annual report he stressed that 'the forest question' demanded 'comprehensive consideration and financial, as well as legislative, support'. In his opinion its difficulties were 'sufficient to absorb the full time and attention of a Minister of the Crown'.[44]

Hay found an interested Minister in the form of the Hon. W. G. Ashford, who was instrumental in having Parliament pass the Forestry Act of 1916, which commenced on 1 November 1916, with supporting regulations effective 1 August 1917. This was much more comprehensive than the 1909 Act, which it repealed. It legislated for a Commission of three members (a Chief Commissioner and two others) and for a total of 2 million ha of State Forests three years from the commencement of the Act. Most importantly, it provided that a state forest dedicated under the Act could be altered or revoked only under the Act, by contrast with a timber reserve, which could be reserved and revoked by the Governor on recommendation of the Minister and the concurrence of the Secretary for Lands. It also provided for the allotment of 50 per cent of the forestry revenue for re-expenditure on forest works, and for the Commission to develop and market forest products — to which end it purchased two sawmills in February 1917.

The administration of forestry continued under a sub-department of the Department of Lands until 1 November 1916, when, under the 1916 Act, the business of the sub-department was transferred to the control of the new Commission. It was thought inexpedient to appoint the three Commissioners under the prevailing conditions of World War I, so Hay was appointed Chief Commissioner as from 1 November 1916 and two Ministers of the Crown (one of them Ashford) were authorised to act as the other two Commissioners in a temporary

capacity. Swain had by this time made a prominent mark on New South Wales forestry, particularly by his assessment surveys in difficult country on the north coast and by his understanding of the industrial aspects of forestry, its problems and solutions for them. As District Forester, North-west Forestry District, he was an obvious candidate for a commissionership in the 1916 Commission. 'But,' he says, 'they would have none of me: he [Hay] was my mentor and I was his tormentor.'[45] He left the New South Wales service and went to work for N. W. Jolly, then Director of Forestry in Queensland, as a District Forest Inspector. Pressure of responsibilities with the technical aspects of forest management led Hay to seek a permanent Commissioner for that work. Jolly was appointed to this position and commenced duties on 8 April 1918, and a Minister continued to act in the other position for some years.

Backed by the first effective Act the government had provided for it, the forest service began to exert a control on the use of the forest which clashed with traditional industry attitudes. The annual report for 1919 notes 'a serious menace [in the form of] opposition to reform in forest management . . . instigated on behalf of individual interests';[46] 'a few individuals of admitted political "punch" are determined to exercise their party influences to the utmost in order to overthrow the Commission's authority'.[47] The reaction of timber-cutters and sawmillers, accustomed to the laissez-faire conditions of the past, which required only a licence and payment of a small royalty and allowed almost unrestricted cutting, was understandable. Under the new regulations, trees for felling had to be marked by forestry officers, the manner of felling them had to be approved, there were sliding rates of royalty commensurate with the value of the product and revenue requirements, and contract rates with buyers were fixed for twelve months.

By an amending Act of 1924 (which became law on 8 April 1925) the constitution of the Commission was altered by substituting a sole Commissioner for the previous corporate body of three members,[48] and Hay (whose seven-year appointment had terminated on 31 October 1923 and been renewed for another term from 9 November 1923) was appointed to the position from thirty-two applicants, the final short list being Hay and Swain, who had become Director of Forests in Queensland on Jolly's appointment as a Commissioner in New South Wales.[49] Amongst several extensions of the Act was one whereby 'the Governor may authorise the Commission to undertake upon such terms as are approved the silvicultural management of the catchment area of any system of water supply'.[50]

Hay retired in October 1926 after thirty years of service. Jolly, who had recently become the first Professor of the new Australian Forestry School (temporarily at Adelaide), after finishing his term as

a Commissioner of the New South Wales service, was appointed to head the Commission in his place.

The Start of Coniferous Afforestation

With his assumption of the commissionership in 1926, Jolly pressed forward with the coniferous afforestation to which he had brought strong initiative on his earlier appointment in 1918. There was a dearth of native softwoods and demand was being met by imports from the northern hemisphere. The evidence appeared to point to growing shortages at that source and World War I had demonstrated the vulnerability of imports. 'The State,' he said 'could not meet the public demand for softwood nor could the public be persuaded to use hardwood in its place.' In this, New South Wales was 'only following the pattern of all civilised countries'.[51] He saw the provision of an adequate supply of home-grown softwood as possibly the most important part of the Commission's work. He also saw productive coniferous forests as important centres of rural industry employing far more labour than the growing of wheat or sheep.

The annual planting program that had developed from the early trials by Ednie Brown, and had risen to nearly 1000 ha in 1924–25, had dropped off owing to a lack of suitable land, species and staff. The choice lay between the several tablelands, where the sites seemed favourable but were far from the market, and the coastal strip, where the markets were more accessible but the sites doubtful. Jolly saw the southern tablelands as the one area where sufficient suitable land was likely to be available for large-scale planting towards a state target of about 200,000 ha. To this end it had been arranged that A. D. Helms (a Danish forester in the New South Wales service who had studied under Schlich at Oxford at the end of World War I) should go to North America and Europe in 1920 to look for suitable species.[52] Many fine stands in the southern tablelands today are a monument to the thoroughness of his investigations, carried out under considerable financial difficulties, and to his energy in implementing his findings.

The government's proposals were strongly supported by the Third British Empire Forestry Conference, held in Australia in 1928, which suggested even 300,000 ha might not be enough and recommended the then annual planting rate of 1000 ha be increased considerably towards such a target.[53] However, the Commission's ambitions, not only for coniferous afforestation but for all its works programs, were to be thwarted by the economic depression of the late 1920s and early 1930s. Parliament decided, in view of the economic conditions, that the Commission should meet its administrative expenditure, which had hitherto been met from separate vote, from its 'Section 13 funds' (the 50 per cent of its revenue as provided by s. 13 of the 1916 Forestry Act). But this revenue had decreased because the local sawmillers were suffering from a depressed building market and competition

from large stocks imported by Sydney merchants the previous year in anticipation of increased tariffs. Jolly sought in vain for a special parliamentary vote for the plantation program, though some special unemployment funds were provided by the Commonwealth Government. The position worsened in 1931 when more sawmills closed, reducing log sales even further. Things improved a little in 1932 but were still slow in the sawmilling industry, faced by a preference on the part of architects and builders for imported rather than local timbers. It was several years before local industry, and the Commission on which it depended so much for operational funds, climbed out of the trough.

The Kessell Report

Before Jolly's seven-year term was complete, the government was contemplating the abolition of the Commission and its return to departmental status. Because these plans had not matured by October 1933, when Jolly's term ended, his appointment was not renewed, and a Bill was brought down to provide for the temporary appointment of an Acting Commissioner, this position being filled by S. M. Tout (who had been Secretary of the Commission since 1926). The government also announced that it was seeking expert advice on the position of forestry in New South Wales and recommendations for its future. In November, Premier Stevens announced that the government had obtained for this purpose the services of S. L. Kessell, then Conservator of Forests in Western Australia.

Kessell arrived in Sydney in December 1933 and left in June 1934. In the intervening six months he 'visited all the important forest areas in New South Wales', travelling '5590 miles by train and 5750 miles by car'[54] and compiled a report comprehensive in its scope and far-reaching in its recommendations — though possibly not what the government had hoped for. Kessell came down strongly against abolition of the Commission. To suggest its abolition:

> in favour of a department under a clerical head is to contemplate a retrograde step which neither past experience nor a study of the problems of the future can be held to justify. It is strongly recommended that no action be taken to introduce amending legislation which may be construed as weakening the powers or lowering the status of the Commission, and that a forester of high professional qualifications and wide experience be selected as Commissioner.[55]

He praised the 1916 Forestry Act. He recommended that for at least ten years no applications for land in state forests be considered and no revocations allowed, that more state forests be established and the 1916 Act be amended to provide that excision could only be carried out through Act of Parliament instead of the resolution of both

Houses. He saw the future dependent on the employment of professional foresters enlisted through cadetships and trained at a university and the Australian Forestry School. He endorsed the Commissioner's work on coniferous plantations, confirmed radiata pine as the most desirable plantation tree for the rapid production of softwood, supported the Commissioner's views that the southern highlands provided the best location for the future plantation estate and recommended an annual planting of 1600 ha. He also took the opportunity to point out the advantages to the states of the newly formed Commonwealth Forestry Bureau's correlating methods of research and circulating results throughout the Commonwealth.

The 1930s and 1940s

Whether or not persuaded by Kessell's recommendations, the government did not continue with its proposal to reform the Commission by putting it under clerical authority and, twelve months after Kessell submitted his report, Swain was appointed to head the Commission, despite having 'sworn never again to enter the shrouded halls of Public Serviceism'.[56]

However, in spite of Kessell's enthusiasm for the coniferous plantation program, the Forestry (Amendment) Act brought down in April 1935 included a clause which has remained in the legislation to the present:

> no scheme of afforestation with exotic species of timber shall be undertaken or extended after the commencement of this Act except with the written approval of the Minister, which approval shall not be given unless evidence as prescribed has been adduced to the Minister satisfying him that the soil, site and climate are such as to render the carrying out of the scheme desirable in the interests of the public.[57]

The Act came into force about the end of the 1935 planting season and its effect was that further planting of exotic conifers stopped (except for the five Prison Afforestation Camps which had been conducted cooperatively by the Prisons Department and the Forestry Commission for about twenty years and then totalled about 2000 ha).

Justifiable or not, it was certainly understandable. In the extensive trials throughout the state to find areas that would grow coniferous species at economic rates and were of sufficient size and suitable location relative to the main markets, there were inevitable failures. Most of these were in the north, central and south coastal zones, which had been chosen for experiment as the most suitably located relative to markets but whose soils or climatic conditions, or both, proved in the event to be inimical to successful plantations. They were also by their location most readily exposed to public view, and ready-made evidence for opponents of coniferous planting, of which

there were many, including the Minister.[58] Removal of eucalypt forest for the purpose, however low its commercial status, had also generated opposition in some quarters. At least the cessation gave an opportunity for review, and the Commission set about a comprehensive survey of the whole position, establishing sample plots, classifying site productivity, developing tables of production, and gathering data on production costs and marketing returns as a basis for decisions 'whether, to what extent and where further coniferous planting will be justified by the returns to be made and the markets and demands to be met'.[59] However, prolonged by World War II until 1946, the interruption to planting caused a gap in age-classes which has made the continuity of supply of wood to industry difficult to organise in recent years.

Another feature of the 1935 Forestry (Amendment) Act was the provision for 'National Forests', more securely reserved than 'State Forests' (being revocable only by Act of Parliament) and intended for multiple use — to produce timber, protect watersheds, provide recreation values, conserve wildlife and provide grazing for domestic animals. Within two years, seven such forests had been declared with a total of nearly 300,000 ha. The establishment of national forests was an earnest intention of multiple and integrated use, and an expression of concern for the environment that anticipated by thirty years that of the 'environment movement' of the 1960s.

Kessell saw the Commission, when Jolly's term ended, as commanding a respect which was:

> a tribute to hard and unremitting work in the interests of the State. . . . When the forestry outlook in 1916 is compared with the present position the Forestry Commission must be given credit for the splendid record of achievement.[60]

> . . . the Commission has accomplished a great work during the seventeen years of its existence. . . . The need for developments along many of the lines recommended in this report have been recognised by the Commission, but lack of funds and shortage of trained staff have placed very definite limitations on the rate of progress.[61]

Swain, in his inimitable grandiloquence, saw it differently:

> I found the 1916 Commission a derelict mess, the New South Wales country sawmilling industry reduced to poverty by advantaged price-cutters nearest to market, its Association moribund save for a vicious hatred of official Forestry . . . in all New South Wales was only timber tax and forest reservations and Forest Guards guessing royalties — differently in each district. Twenty years after its constitution the grandiose New South Wales Forestry Commission became a corpse. It had died from lack of Forestry . . .[62]

This trenchant view receives some support from Kessell's comments that, in the six months he was observing the Commission, there had been a general retrogression under a non-professional head; and he used this as support for the argument that the head of the Commission should be a professionally trained forester: 'some of the well-intentioned blunders arising from lack of knowledge of field conditions and of forestry are likely to provide the new Commissioner with a legacy of troubles for many years to come'.[63]

However, Swain's view was also coloured strongly by his own list of priorities, the highest of which was that foresters, bush operators and sawmillers should develop a system whereby each was adequately and fairly paid for his contribution to the growing, harvesting and marketing of forest products. He had sown the seeds for such a system twenty years before; that they had fallen on barren ground not only irritated him professionally, it affected him deeply. As B. U. Byles has pointed out, there was in this conviction a strong socio-religious element: not only was his 'stumpage appraisal system' meant to ensure that foresters, bush operators and sawmillers would be adequately and fairly rewarded from the final selling price of the manufactured product, and meant to bring stability and reasonable prosperity to the timber industry, but it was also 'based on a religious conviction that human beings can be inspired to sacrifice their own personal interests in favour of the long term interests of the public'.[64] The social injustices of the uniform royalty system to sawmillers disadvantaged by long distance to markets, 'the competition from a glut of timber from settlers' clearings, their miserable way of life and their abject poverty' as he had experienced it in his early days in the forests of the north coast and north-west, all stimulated in him an enormous sympathy with the pioneer settlers and bushmen of that time and an ambition to create a new situation that was professionally efficient and socially just. That the strength of his concern should turn his mission into an obsession was unfortunate but perhaps inevitable, for he was, as Byles suggests, attempting to bring about a 'moral revolution' of considerable magnitude in the forestry–timber industry interrelationship.

Stumpage (or royalty)* is the price charged the customer by the owner for wood in the forest. The method of calculating it and the amount this method produces are very important to wood-producing organisations because it is usually a major source of their revenue. It is also a very complex matter because there are a great many factors involved in determining the selling price of wood 'at stump'. The role of stumpage in forestry financing and some of the complexities in determining it are of great importance and a source of endless debate

* The terms will be used synonymously in this book, as they so commonly are in Australia, though many authorities and some accepted terminologies prefer to distinguish between them.

amongst foresters. Hanson and Leslie[65] have suggested that a stumpage determination system might be judged as to how closely it approaches the ideal by considering how well it (i) covers the costs of growing the wood; (ii) accounts for the relative disabilities of harvesting, processing and marketing the various parcels of wood; (iii) encourages the development of efficient and competitive industries; (iv) enables the forest industries to show earnings on investment comparable with other economic activity of comparable risk; and (v) recovers the full market value of the timber. Most authorities would accept these as a reasonable, however debatable, set of criteria.

Swain considered the most sensible concept of stumpage was as a residual after costs of harvesting, processing and marketing, with a margin for profit, have been subtracted from the selling price of the product. His concern then centred largely around item (iii) of the above criteria — that the selling price set by the forestry organisation for a log at stump in the forest should be such as to result in sawmillers having equal opportunity to compete in the principal market when they were variously located relative to both stump and market. Stumpage appraisal was, in essence, determining the relative disabilities of sawmillers in different locations regarding the harvesting of the log and the processing and marketing of the timber from it, and then taking these into account in determining the selling price of a log to each sawmiller. He saw in stumpage appraisal both social justice and a stable industry — a happy and efficient partnership between grower and processor. He had introduced this system unofficially in the north west in 1912[66] and saw the principle of it accepted, though unwillingly, by head office by the time he left for Queensland in 1916. When he was appointed Director of Forests of Queensland in 1918, he implemented it there. On his return to New South Wales as Commissioner in 1935 he was profoundly disappointed to find that it had reverted in his absence to the concept of a uniform tax. Overcoming preliminary resistance to the scheme on the part of both the Minister and industry, he implemented it in the calculation of stumpages for hoop pine in the Richmond–Tweed district and later for other species throughout the state.

If stumpage is calculated as the residual after the costs and profit of all operations from stump to finished product are subtracted from the selling price of the finished product, it is clear that, given a fixed selling price for the finished product, then operational costs and profit fix an operational limit beyond which it is uneconomical for the operator to draw supplies and beyond which the grower can expect to get any stumpage. Given the need for the government to derive some revenue from the forest, particularly the need for the State forestry organisation to derive revenue from the forest when what it can spend on a forestry program is related to that revenue, the only way to push operations beyond the particular limit to supply, which is fixed by a

certain stumpage and costs and selling price, is to increase the selling price. This was the basis of the argument, simple in essence but complex in its ramifications, which Swain carried out with Commonwealth and State price-fixing authorities during World War II and for a few years after it, under the catch-cry of 'price-to-get-supply'. This running battle with these authorities to have selling prices raised to bring in urgently required wood from areas in New South Wales outside limits fixed indirectly by price control, at the same time retaining reasonable revenue for departmental operations, is described by him in his extensive personal records and in the Commission's annual reports of the time.

Concerned as he was with the need for strong human and professional relationships between forestry and industry, Swain gave ready response to suggestions in the mid-war years that these two groups set up a semi-formal organisation to look at and try to solve their mutual problems. Thus was born ESTIS (Eastern States Timber Industry Stabilisation), later to be AUSTIS, as it took on national scope and status. He threw into its early formation his great energy and his philosophy — of life and the profession. It became alternately his 'hope and despair'.

From the outbreak of war in Europe in 1939, the Commission, just then emerging from problems of the economic depression and in fact still concerned with unemployment-relief works, faced the additional problems of meeting defence requirements for wood, which involved both changes and increase in demand, and of finding supplies of appropriate substitute species for imports, which prior to the war constituted nearly a third of consumption. Added to this was the need to exercise restraint and control over supply appropriate to a period of war, the length of which could only be guessed at. The increased demand for wood and the need for import substitutes made increased radii of supply inevitable. Longer operating distances and difficulties with manpower, equipment and maintenance under war-time conditions meant increased costs. Under these circumstances, fixed prices on wood products, as part of a necessary and universal scheme of price fixing in war-time, brought special problems to a Commission eager to play its role in defence. Some compensation lay in the extra administrative control given to the Commission by such regulations as the National Security (Timber Control) Regulations promulgated in March 1942 (by which authority was delegated to the Minister for Forests to require the owner of standing timber required for war purposes to sell it) and the sort of restrictions placed on the use of such woods as hoop pine and coachwood with special properties for war purposes. But it was inevitable that many proposed works had to be curtailed because of the lack of finance and the reduction in staff caused by the enlistment of nearly three hundred people in the armed forces.[67]

Post-War Consolidation and Expansion

Administration

The 1930s and 1940s were demanding years for forestry organisations in Australia, not least for that in New South Wales. The service, as a conservation agency rather than a mere revenue-collecting agency, was hardly a decade old when the effects of the economic depression began to be felt and, by the early 1930s, its main energies were diverted to organising unemployment-relief work programs on a vast scale with a very limited budget and with a staff capable of providing the necessary direction and supervision already stretched painfully thin by the general financially stringent conditions. Hardly had the country struggled from the depths of the economic depression when World War II broke out and, like the other forest services, the Commission had the task of increasing the amount and kinds of wood it normally supplied to the market despite a reduced number of skilled and willing bush workers, a deficiency of harvesting and hauling machines, a shortage of parts and replacements for them, and continuous competition for transport. The war was immediately followed by great demands for wood on the part of a nation eager to make up for the recent deprivations in an ambitious industrial and housing program.

It was unfortunate that, in the early post-war period, much of Swain's energy and that of the service as a whole, was taken up by what Byles has called 'The Swain–Wurth Feud'.[68] Swain's version of it is on public record;[69] and the same papers provide many clues to an explanation and understanding of Swain's involvement. But whatever the rights and wrongs of the events, the effect was to bring the Commission in the last years of Swain's headship to 'a state of near-chaos',[70] from which it took some time to recover. Swain was succeeded in 1948 by E. L. S. Hudson, who had entered the Commission in 1919, become its management officer in 1936 and, as Deputy Timber Controller in New South Wales since 1942, had succeeded Kessell as Commonwealth Controller in 1945.[71] In 1949, the government passed the Conservation Authority of NSW Act, which brought the Commission into the Authority under its Minister, Hudson becoming one of the five members of the Authority.[72] It also amended the Forestry Act 1916–46, which had provided for a sole Commissioner, and introduced two Assistant Commissionerships, to which J. Brown and B. Harris were appointed. Hudson retired in March 1966, being succeeded by W. D. Muir, who had been appointed an Assistant Commissioner in 1953. F. M. Bailey was Commissioner for a year following Muir's retirement toward the end of 1970.

General

The post-war years saw the consolidation of silvicultural and management practices which had been getting under way before the war but

had gone into abeyance with the different priorities of the emergency period. They also saw a change of pace and direction of Commission activities and the implementation of many ideas which had been shelved for the duration of the war. Developments during the war years in aerial photography, communications and machinery contributed to more effective inventory, fire-protection systems, road works and harvesting after the war. In the rapidly expanding post-war economy, capital became more freely available for silvicultural treatment of the native forest, for plantation establishment and for works programs involved with fire protection and harvesting. The rate of recruitment to the professional ranks was increased considerably.

Funding and Royalties

In the increased tempo of the times, the most fundamental matter was the manner and means of funding the Commission, which, in direct and indirect ways, involved the Commission itself, the forest-based industries, the State Government and the Commonwealth Government. There were two basic elements in this. One was that 50 per cent of the Commission's revenue of a year was returned to it for expenditure as s. 13 funds in the next year by virtue of the 1916 Act. This was the only legislative requirement for the provision of funds to the Commission. Any balance at the end of the financial year could be carried forward to the next year, but government approval was needed for any further extension. Most of the rest of the Commission's expenditure was financed by allocation of government loan funds and votes from consolidated revenue, the amounts of which depended on government budget priorities. The votes for any one year had to be spent in that year. The other element was that the major source of the Commission's revenue, and thus the major source of its legislatively guaranteed s. 13 funds, was stumpage (royalty). From the mid-1930s this had been calculated as a residual; that is, whatever was left after the costs of harvesting, processing and marketing had been subtracted from the selling price of the product.

Immediately after World War II there was an increased demand for wood for reconstruction. In 1948 sawlog consumption, for example, was double what it had been in 1938. Imports were considerably below their pre-war level of 50 per cent of consumption. This meant that the Commission had to try to increase the supply from the native forest and it set out to do so as fast as the limitations of manpower, equipment and economics allowed. In 1947, it was able to extend access into areas hitherto outside the zone of supply through a special increase in the selling price of native timbers.[73] By 1951, industry was facing rising costs as a result of increases in rail and shipping freights and in the basic wage and was asking the Commission to offset these by decreasing royalty charges. The Commission, of course, was also faced with rising costs in its operation and, far from reducing

royalties, wanted to increase them. The government decided that forestry activities could no longer be supported by State funds as generously as before and:

> the trade was informed that in order to clear up any misconceptions in relation to covering itself for cost increases, it should clearly understand that royalty should be regarded as the cost of raw material . . . [not as a residual]; . . . that the Commission proposed to conduct its activities on a commercial and business basis and provide in its return from the sale of timber a revenue equivalent to the cost of conducting the Commission's forest activities and providing for debt servicing . . . [and] that these principles were incorporated in a review of royalty which would be coincidental with the decision expected early in the new financial year on an application by the trade [to the Prices Commissioner] for a price increase to cover cost increases since the last price determination.[74]

Royalties were increased in the face of a resentful industry and, with the aid of $1.5 million of loan funds, which, though it represented about 30 per cent of total expenditure as it had done for several years, was little more than the increase in expenditure over the previous year, the Commission achieved 'budget equilibrium' in the following financial year.[75]

For the next two years, however, the government reduced the loan allocation to 7–8 per cent[76] and the 1952–53 general economic recession reduced royalty revenue considerably. Budget equilibrium was only achieved by drastic curtailment of essential maintenance and capital works.[77] The Commission continued for some time to fight a losing battle to put the new concept into practice. Costs rose with general post-war inflation; the vagaries of the weather brought fluctuations in harvesting and marketing and so in revenue; and there were emergency demands because of unprecedented bushfires. Gradually the concept of budget equilibrium was abandoned and the State Government resumed responsiblity for filling the inevitable gap at the end of the financial year between approved expenditure and the revenue from the prescribed sources. Nevertheless, the s. 13 revenue continued to provide the bulk of the funds to support the Commission's expenditure, and the sensitivity of the connection between the two was well illustrated in the early 1960s. The Commonwealth Government abolished import licences, and importers seized the opportunity to import larger quantities of timber from North America than normal on short-term credit at high interest rates. Then the Commonwealth Government imposed a credit squeeze in late 1960, which depressed the building industry. The imported timber which had to be disposed of provided strong competition for locally produced hardwoods already in a weak position because of the depressed market, with little sympathy from the Tariff Board, which refused to

vary the existing rates of duty on imported timbers. This had the inevitable effect on the Commission's revenue from log sales and on the Commission's works program projected for the following year. The credit restrictions brought considerable unemployment in the industry generally by mid-1961. Retrenchments were avoided only by special allocations from the State and Commonwealth Governments.

The Commission's intention to change the basis of calculating royalty from one of 'residual' to 'cost of raw material', which it had notified in 1951, was also modified considerably; but it did take the opportunity in 1954 to restructure royalty in regard to two principles. The basic principle of the 'sawn stumpage appraisal system', which had been in vogue since 1937, was for stumpage to vary inversely with the cost-distance of the standing tree from the market — a natural principle in the residual concept. Various refinements were added as more information was gathered on the effects of species, log size and log quality on the amount and quality of the recovered material, and on the effects of varying market conditions on the selling price of the product. These refinements were all aimed at providing an equal commercial opportunity for different sawmillers supplying the same 'key' market, assuming 'economic' mill sites, and at ensuring that all the timber available to the market and demanded by it would be used profitably. The restructuring of royalty was directed at the recognition of 'logical' rather than 'economic' mill sites but, in particular, at relating royalties much more directly to log quality. Given the general increase in royalty which the commission had implemented shortly before, restructuring of the royalty was now possible because it gave scope for variations of royalty rates according to variations in log quality at the cheaper end of the scale, which had not been possible in the previous low levels. This meant that lower-grade and smaller-girth logs could now be brought into use. Because of the basic Hoppus system of log-volume measurement and the fact that log volume was calculated as gross rather than nett (that is, with allowance for defect for each log), the system came to be known as 'gross Hoppus'.

Wood Resources

The 1916 Act listed as a pre-eminent objective of the Commission that it should 'conserve and utilise the timber on Crown-timber lands to the best advantage of the State' and in doing so 'provide adequate supplies of timber from Crown-timber lands for building, commercial, industrial, agricultural, mining and domestic purposes'. In effect, the Commission spent the first decade after World War II sorting itself out, gathering its operational resources together and flexing its muscles. For the next decade, with the announcement of a ten-year program in 1957, it set about implementing its charter with renewed strength. It drew attention to the fact that the native forest was mainly composed of heavy, hard, durable woods and lacked the softer,

more easily worked woods for which the considerable demand was met by imports; that the area of commercial forest was limited and, even under good management, its production would still fall short of demand; and that the contribution from privately owned land, then about 50 per cent, could not be relied on in the long term. Its policy was 'directed primarily at overcoming the present dependence on imports, and in achieving, as far as possible, self-sufficiency in timber supply, not only in respect of hardwoods but softwoods as well'. Measures in its ten-year program to implement that policy included a 'vigorous softwood plantation programme' and:

> The dedication as State Forests of all remaining timbered Crown lands which have a present or potential value as a source of timber supply; the construction of roads into presently inaccessible productive State Forests; . . . intensified management . . .; improvement in utilisation and yield.

The starting point in these endeavours was a knowledge of the extent, location, ownership, structure and condition of the native forest. The need for a thorough inventory of the state's forest resources had been recognised before the war, but the priorities of maintaining supply during the war years put it in abeyance. The demands for wood in the immediate post-war years, and the likely future demands resulting from the country's ambitious reconstruction and immigration programs, resurrected the need for assessment of the capacity of the native resource. Thus, a classification of both crown and private forested land, through a combination of air-photo interpretation and field survey, was begun.

In 1950, a Timber Resources Inquiry was initiated by the Conservation Authority. Its report in 1954 particularly stressed the likely elimination of the private resource in something like twenty years at the present rate of cut, though the distribution of mills relative to this source meant that some would cut out before this time and others would be able to sustain production a little longer. It was also clear that the crown resource could not meet future demand either in quantity or kind. These two findings were the basis for the 'vigorous softwood plantation programme'. In 1962, the State forest services and the Commonwealth Forestry and Timber Bureau began an exercise aimed at forecasting national requirements of wood and wood products by the end of the century. This involved another inventory of the native forest resource, the results of which suggested that New South Wales was depleting its forest resources faster than they were being replaced and that an increased rate of coniferous afforestation was justified. A more comprehensive resource inventory than ever previously carried out, code-named FORINS,[78] was begun in 1971 both

at the behest of the State Government and to supply appropriate data for the national FORWOOD Conference which was planned for the near future.

The 1916 Act provided much more stringent control over the harvesting of the forest than before through a 'Special License' system whereby a sawmill had an area of forest allocated to it, usually for a term of five years. In the early 1940s, this was changed to annual allocation, which gave the Commission a little more control over the rate of log removal. In 1951, the system was changed from area allocation to allocation of annual log quotas from areas nominated by the Commission. From 1965, quota holders were required to spread their production evenly by quarterly periods except where seasonal effects made this impracticable; and, from 1969, the length of issue of a Special Licence was extended to a maximum of twenty years and placed under ministerial control.[79] During the post-war period, too, the Commission began exercising much more stringent control over harvesting by 'tree marking', the Commission rather than the feller nominating the trees to be felled.

The nucleus of the state forests was established by the 1916 Act, which leglislated for 2 million ha of reserved forest within three years. During the next few years, preliminary elementary management plans were compiled for a number of the native forests, particularly those of the north coast, and a cut was prescribed on the basis of a rough assessment of the growing stock through a group selection type of silviculture. Lack of sufficient trained staff to supervise operations and revise the plans appropriately, plus the fact that the yield was more often prescribed according to mill capacity rather than forest capacity,[80] led to single tree selection rather than group selection. This, together with the effects of wildfire, has resulted in the lack of regeneration and poor distribution of size classes which characterises many of these forests today. In 1939, an intensive investigation of the Bago highland forest was carried out and a detailed management plan compiled. This was followed by the Murray River Management Survey of the red gum (*Eucalyptus camaldulensis*) forest commencing in 1944.

In 1951, the Commission began the compilation of working (management) plans along classical European lines for the coastal eucalypt forests based on more sophisticated methods of assessment and aimed at prescribing a yield that could be sustained. The job of carrying out the assessment and compiling the plan was given to newly graduated foresters, who were posted to the appropriate sub-districts and made responsible for the implementation of the plans. One of the essential functions of the plan was to provide an efficient means of allocating the Special Licence areas to sawmillers and of controlling the felling on them. To improve the efficiency of assessment, the Commission carried out extensive investigations into various methods and intensi-

ties of sampling and, within the period of the ten-year works program, had established reasonably well the sorts of procedures necessary for a range of purposes.

An essential feature of the ten-year program was the 'silvicultural treatment . . . of all indigenous forests where the yield or potential yield justifies such measures, or where such other factors as the production of timber for special purposes, or in the national interest, are paramount'. This, of course, was not something new. As Jacobs has pointed out,[81] silvicultural treatment of some of the eucalypt forests was started by Ednie Brown in 1890 and carried out over a considerable area during the economic depression of the next decades. Swain extended interest in regeneration and silvicultural improvement of the forests, particularly those of the north coast, by a thoughtful, practical and stimulating paper that was attached to the Department's report for 1911. The area treated annually was increased as fast as money and men were available, to such an extent that Jolly was able to report in 1927 that 'the area worked through for regeneration during the last ten years has now embraced the greater part of the valuable and accessible forests which had been subjected to excessive exploitation during the preceding generation'.[82] Over the years, silvicultural treatment of various kinds was implemented under various names, most commonly 'timber stand improvement' (TSI). As the Commission was to say in each of its annual reports covering the ten-year program, there was never enough money available for the treatment it would like to have done. Its target for the program was 12,000 ha of the most valuable forests per annum.

The major aim of the program was coniferous afforestation. From the earliest times there was never any doubt that conifers should be grown to supply soft timber for a state that had very little of it as an indigenous resource. The question was always a matter of how much to plant and where. At the start of the program there was a total of 24,000 ha and a planting rate of 2000 ha per year. Vigorous moves were made to obtain land suitable for planting other than state forests, the aim being a minimum total target of 80,000 ha. In 1959, for example, nearly 20,000 ha of alienated and leasehold land were obtained in the Tumut district, which had for about thirty years been seen as one of the major plantation centres. The exercise in forecasting national requirements by the turn of the century carried out in 1962 suggested that the target of 80,000 ha should be lifted substantially, and the Commission started to talk in terms of a rate of 10,000–20,000 ha per year. This was endorsed at the first meetings of the Australian Forestry Council in 1964–65 and the New South Wales target was lifted to 400,000 ha. From 1966 onwards, New South Wales, along with the other states, was assisted by loans under the

Softwood Forestry Agreements Acts and, during the period of the first and second Acts 1966–77, planted more than 70,000 ha, thereby roughly doubling its coniferous plantation estate.

The 1960s was a restless decade for the timber industry and, before its ten-year program was completed, the Commission was heavily involved in an inquiry by a Select Committee of the Legislative Assembly into the Timber Industry set up in October 1965. Although the terms of reference of this inquiry were simply stated — namely, to report on '(a) The future timber needs of the State, (b) The availability of present resources, (c) The reforestation programme required, (d) The most effective use of forest products with special reference to marketing' — they had wide ramifications, and it was late in 1967 before, following a very comprehensive inquiry, the committee presented its final report. The urgency with which it viewed its answers to the first three questions was sufficient, however, for it to present an interim report in March 1967 in which it urged the government to take immediate advantage of the offer then being made by the Commonwealth Government of extra finance for coniferous afforestation and to explore with the Commonwealth the possibility of similar funding for treatment of the indigenous estate. The final report contained a great many recommendations regarding frequent forecasting of supply and demand; stumpage appraisal; sawmill quotas and licences; a 'Land Use Committee', especially to review land legislation as it affected forestry; various matters of administration of the Commission; loans for private forestry; professional, sub-professional, technical and technological education and training; the effects of imports on the local wood-processing industries; a special vote for fire protection; increased publicity for the Commission; and the forestry and the timber industry as a source of employment.

Of the numerous benefits which accrued to the Commission from this inquiry, one of the most important arose from the opportunity it afforded the Commission to bring before Parliament the enormously complex matter of 'land' with which it was continually involved, especially through the maze of tenure which existed for historical reasons, and the problems which plagued the Commission because of this. As a result, amendments were made to the legislation over the next several years, which, amongst other things, straightened out legal aspects of timbered crown lands and legal aspects of recreation on lands under the Commission's jurisdiction, and increased the statutory minimum area of state forest and the amount of this to be suitable for afforestation with exotic conifers. The statement of evidence by the Commission to the inquiry on the matter is possibly the most comprehensive outline of the history of forested land in New South Wales presently available.

Fire

The success of all the works programs, of course, depended on maintaining the forest as safe as possible from wildfire. The birth of the Commission in 1916 was ushered in by bad forest and grass fires in many parts of the state. Both the early and late months of 1926 produced very destructive fires. Worse was to follow in the 1939 fires, which caused considerable damage in the south, though not to the same extent as in Victoria. Protection up to this time lay in firebreaks and a telephonic communications system. Suppression was a manual operation. Radio installation began about 1940, and 'La France' fire engines, the first mechanical equipment for suppression, were acquired in 1947 from war disposals sources.[83] From then onwards, the Commission either modified various kinds of water-tankers for fire-fighting purposes or had tankers built to its own specifications.

The 1951–52 fire season was regarded as the most severe for fifty years. It was fortunate that the Bushfires Act 1949 had by this time stimulated a greatly expanded organisation for fire suppression through Bush Fire Brigades otherwise the losses might have been considerably more severe. As it was, Commission staff attended more than a thousand fires and more than 400,000 ha (one seventh of the state's dedicated forest) suffered some effects. Hardly had the wounds of this bad season begun to heal when the eastern part of the state suffered a further devastating season in 1957–58, which led to more than a thousand fires in state forest, with more than 200,000 ha burnt. It was the effect of this season, particularly the damage in the Blue Mountains, which stimulated R. H. Luke of the Commission to propose the fire-prevention schemes throughout the eastern zone of the state which are now a feature of the state's prevention and suppression system.[84] He was prompted to this by the evident success of the Hume–Snowy fire-prevention scheme, which had been set up in 1951 to protect the catchments (already severely damaged in the 1939 fires) on which the Snowy Mountains Authority had begun to develop its irrigation and hydroelectric engineering scheme. This time also saw the Commission move, as did several other states, to fuel reduction using prescribed broad-scale burning.

The 1970s

Introduction

J. L. Henry became Commissioner in November 1971 after a long apprenticeship to the position in many aspects and activities of forest management within the Commission. For the next decade, the Commission was to be under an almost continuous state of siege against the attacks of people armed with an array of dissatisfactions concerning its role, its policies and its practices.

During 1972, Parliament passed two pieces of legislation involving forestry. In one of them,[85] the objects of the Commission were stated

explicitly for the first time. The two (out of three) new clauses that are important for present purposes are:

> 8A. (1) The objects of the commission shall be—
> (a) to conserve and utilise the timber on Crown-timber lands to the best advantage of the State;
> (b) to provide adequate supplies of timber from Crown-timber lands for building, commercial, industrial, agricultural, mining and domestic purposes;
> (c) to preserve and improve, in accordance with good forestry practice, the soil resources and water catchment capabilities of Crown-timber lands;
> (d) to encourage the use of timber derived from trees grown in the State; and
> (e) consistent with the use of State forests for the purposes of forestry and of flora reserves for the preservation of the native flora thereon—
> (i) to promote and encourage their use as a recreation; and
> (ii) to conserve birds and animals thereon.
> (2) In the attainment of its objects and the exercise and performance of its powers, authorities, duties and functions under this Act, the commission shall take all practicable steps that it considers necessary or desirable to ensure the preservation and enchancement of the quality of the environment.

Prior to this, for more than fifty years, the Commission's brief appears to have been defined only in general terms as being responsible for 'the control and management of State forests and timber reserves, and also of flora reserves and catchment reserves'. Nevertheless, judging by its performance during that time, the Commission seems to have had little doubt that its major objective was the growing and gathering of wood to meet the needs of the state. The Commission of 1972, bolstered by the inclusion in the legislation of an increase in the statutory total minimum area to be retained as state forest from the previous two million hectares to a little more than three million hectares (of which more than half a million hectares was to be suitable for afforestation with conifers), also seems to have had little doubt that the growing and gathering of wood was its *continuing* role. In its 1972–73 annual report it referred to the 1972 legislation as '*re*-affirming the Commission's *primary* object of conserving and using timber on State Forests and other Crown-timber lands to the best advantage of the State' (my italics).

And well it might do so — for fifty years that role had certainly consumed most of its energy. It was clear from the background to the 1916 legislation that the Commission's charter was the conservation of what remained of forest reserves as a means of ensuring the supply

of a raw material in continual demand — though this objective, seemingly simple on paper, was far from simple in its implementation. It was more than twenty years before there was even a nucleus of professional foresters to begin the enormous task of determining the location, extent, condition, growth and drain of the crown forest estate and to devise and apply measures of protection, silviculture and harvesting that would conserve and enhance it. At the same time the Commission had to provide the public with its expected quota of kinds and quality of wood through a long-established rural and urban processing industry which had both considerable political support and views on the conservation of the estate, and on the regulation of supply from it, that were often markedly at variance with the views of the Commission.

By the 1940s, 'stumpage appraisal' was becoming effective in equalising industrial economic incentive and return; the more efficient regulation of yield by volume and area rather than by area alone was being implemented; and 'tree marking' was beginning to provide both more efficient utilisation and more effective silviculture. Although the war interrupted this gradual move towards firm professional direction, industry at least got used to some elements of control during the emergency period. The post-war years saw more professional staff available and an attempt by the Commission to bring the management of all its forests, within a reasonably short time, under 'working plan control' with the matching of cut to increment. This new discipline was unacceptable to all but a few elements of industry. It was also difficult for the Commission to impose. Not only did industry wield considerable political influence, but it had access to readily available supplies of wood from freehold and leasehold land. But, with little knowledge of the extent, nature and rate of depletion of this non-public resource, the Commission considered control of harvesting of the crown forests essential to ensure long term supply.

By the early 1970s, as the flush of yield from non-public sources began to diminish and it saw its own future more and more dependent on the regulation and control of crown-forest working (management) plans, industry became more reconciled to 'Crown quotas'. This had also gained stronger political favour as a way of bringing about greater 'decentralisation and regional stability'. By this time, more effective inventory was giving a clearer picture of the capacity of the native forest estate, and mathematical tools allowing the ready calculation of yields from a range of silvicultural and managment options for the rapidly developing man-made coniferous estate were pointing the way to the extent of the contribution the Commission expected this source to make to the future wood needs of the state. Thus, if 'conserving and using the timber' on the estate under its control was the main object of its political charter (and neither its political masters nor, by and

large, the public had denied this), the Commission might well have felt some sense of satisfaction that, at last after half a century, it had brought things sufficiently under control for it to carry out its major objective reasonably well. Understandably, it would not welcome suggestions that would upset this position after such a long struggle to attain it. But this was just what would happen, from the Commission's point of view, if it were to accede to the demands of the 'environmental movement', which was really getting under way about this time.

One of the major sources of conflict was the matter of increased reservation of land as 'national parks'. Much of the land which the proponents of national parks saw as most desirable for this purpose was crown-forested land traditionally used for wood production. The Commission did not oppose the general principle of national parks — indeed it endorsed it — but it saw the responsibility for national parks as more suited to another authority, and it saw any restriction on wood-gathering from the forest traditionally used for this purpose, or the transfer of any of this land to another authority for the purpose of national parks, as inevitably increasing the difficulty of its fulfilling its major objective of supplying wood to meet the state's needs. It argued that the national park concept implied single use, whereas its own management was oriented to multiple use. It may well have been open to the accusation of inconsistency, for at the time, the Commission was actively involved within the bureaucracy in a rationalisation of land use and in the release and exchange of land for national park purposes. Indeed in its application of multiple use it had excised flora reserves, forest preserves, creek-side retention strips and the like from wood production for single use. But it could reasonably argue that in all these cases the areas involved were comparatively small and had a limited effect on total wood production, whereas the areas being claimed by the groups pressing for national parks were large and would reduce wood production considerably. The Commission's reluctance to see wood production excluded from areas that it had struggled for years to have reserved for that purpose, and on which it had worked hard to make wood production effective, was natural. It also saw considerable irony in the fact that in many cases it was the very success of its efforts to make an effective forest for wood production that made it so desirable as a national park.

The Commission also claimed that most of the objectives of national parks could still be met without excluding wood production. The validity of this claim rested to a large extent on how one interpreted the major objectives of a 'national park', a term broadly used and widely interpreted. The Commission would sensibly agree that wood production was quite incompatible with the concept of 'wilderness', which, for some people, was a major objective of establishing national parks, but it saw wood production as quite compatible with most of

the aesthetic, conservation and recreation purposes normally also associated with this kind of reservation, as it considered it was already demonstrating in its 'multiple use' management. It was unfortunate that this claim was made just at a time when the public was becoming increasingly aware that for some years the Commission had been moving away from the unobtrusive single-tree and small-group felling which had characterised the harvesting of much of the native forest hitherto, towards the felling of much larger 'groups'. The Commission saw convincing silvicultural and economic reasons for this change: conservation interests on the other hand now saw native forest management as undesirable 'clear felling' and a further manifestation of the Commission's move to 'intensive forestry' (in contrast with the previously more acceptable 'selection felling' as a function of 'extensive forestry') — a procedure that was quite incompatible with any of the purposes conventionally ascribed to national parks.

Indigenous Forest Policy

By the mid-1970s, so many issues had arisen around what the Commission was doing and should be doing with the native forest that it published a document titled 'Indigenous forest policy',[86] which, according to its foreword, was 'issued for the benefit of [its] staff' but, by its nature and the manner of reference to it in the Commission's 1976–77 annual report, was for public consumption: it was an explanation of, and justification for, its policies and its operational practices. It its historical background to the subject, the Commission pointed to the considerably increased post-war demand which had, in 1952, prompted an inventory of the native forest and a comparison of likely future demand and supply of wood. This suggested there would be a deficit in supply in the future — a deficit that could not be overcome by silvicultural treatment and would best be met by acceleration of the coniferous plantation establishment program. However, standards of utilisation of the native forest were lifted, working plans were introduced to ensure stricter control, and silvicultural treatment was expanded. Inventory of the forests which had been harvested immediately prior to the war showed a deficiency in regeneration, and the silviculture on these forests was particularly directed to overcoming this. During the late 1960s and early 1970s, there were several developments. Techniques for analysing the economics of forest investment and the opportunity to apply them had become available; the need to rationalise the various silvicultural and management practices that had evolved over many years had developed; and the collecting of data for the national FORWOOD Conference of 1974, and consideration of national objectives on the basis of it, had provided an impetus for, and assistance in forming, new state objectives. At the same time there had been increasing pressure from certain groups for the Commission to reconsider the priorities of its

present objectives. In response to all these influences, the Commission claimed the time was appropriate to formulate a management policy for the native forest estate in its charge, and 'Indigenous forest policy' was the result.

Anyone seeking clues to the basis of the conflict between its critics and the Commission over its management objectives and their implementation need have gone no further than this document. The Commission saw its primary objective as 'to manage the forests of New South Wales for the benefit of the people of New South Wales'; and it saw that benefit in the objects of the Commission as prescribed by the 1972 legislation. It recognised the many values, uses, services and products of forests and the many demands people made on forests for them. It saw the 1972 legislation as imposing a responsibility on it to meet those many demands '*with an emphasis on timber production*' (my italics). It saw a 'capacity for wood production' as being 'essential to State Forest classification and management' (that is, if a forest were classified as a state forest, it was because it was suitable for wood production). It considered that, although production was the dominant use of a forest, management could also meet 'the demands of catchment protection, recreation, wildlife habitat, nature conservation and education'. It also considered that, where timber production was:

> only a minor use of a substantial forest area and the dominant use lies in the fields of scenic and nature conservation plus recreation or catchment protection, then management control and land title may be more appropriate to the National Parks and Wildlife Service.

As evidence of this view, it pointed out how numerous areas of state forest had been revoked in favour of national park reservation over the previous years. It was on these general premises that the policy for the management of the native forest estate had been formed and was now formulated.

Out of a total native forest area in the state of about 16 million ha, the Commission had a total management responsibility for about 3 million ha of state forest, of which 2.4 million ha was 'commercial forest' (i.e., used for, or with the potential for, wood production), and a partial management responsibility for about 6.5 million ha of leasehold and vacant crown land, less than half of which was commercial forest. The commercial state forest was made up of 150,000 ha of 'rain forest', 1,300,000 of 'coastal hardwoods', 500,000 of 'tableland hardwoods', 400,000 of 'cypress pine' and 100,000 of 'river red gum'. The other crown commercial forest had roughly similar areas of these kinds of forest (except for rain forest, of which there was only 50,000 ha). It was to this area of native forest that the Commission's policy of meeting the wood needs of the state as far as

possible was directed and, as background, it outlined the potential of the several broad kinds of forest for this.

For a long time the scattered rain forest areas had provided timbers of great beauty and value for special uses. Because of the particular characteristics of these areas, it was essential to retain a viable forest structure. Whereas it was possible to do this and still log economically in the case of the subtropical rain forest, by selective logging leaving about half the canopy, it was not possible in the other types of rain forest. The coastal hardwoods, which constitute the most important source of wood, fall into two groups — the accessible forests of the coastal plain and the more mountainous, less accessible forests behind it. The former include the bulk of the native forest of good terrain and economic location which have been logged and managed for many years with yields at present fairly well related to increment. Because of their nature and location, they are under increasing demand by the public for recreational use. The latter have only been subject to significant logging since World War II. The volume of accessible timber on them was limited and the present cut exceeds the yield capacity of the forest. With the exception of a few areas of high yield in the southern highlands, the forests of tableland hardwoods are of low commercial value and very limited potential for hardwood production. The value of the cypress pine resource lies mainly in the durability of the wood and the occurrence of the species where there is little else; but the fragmented nature of the resource and its low productivity make it of limited value. The river red gum forests are now also of very limited value for wood production.

At present, New South Wales imports about a third of its sawn wood, mainly structural softwoods and furniture woods, and imports about a third of its paper and paper-board material. The Commission's policy is to move as far as possible towards providing the bulk of the state's requirements from local production by harvesting the native forest to its economic limit and supplementing this yield from plantations of exotic conifers. In determining its indigenous forest policy the Commission forecast a decreasing supply from the former and an increasing supply from the latter, based on its current plantation establishment program. It assumed that there would be an approximate balance in domestic supply–demand by the year 2010 for sawn wood and somewhat earlier in the case of pulpwood for paper and board. There would be a substantial deficit for the next twenty years, decreasing fairly rapidly during the following ten, which could only be met by importing from other states or overseas. If either the productive role of the native forest or the role of conifer plantation establishment were reduced, then the domestic deficit would be concomitantly increased. On the basis of its wood production aims and its forecast of the future supply–demand situation, the Commission formulated certain management policies for the several broad kinds of forest.

The policy for rain forest was to reduce logging to that of special woods by selective fellings at a level which would maintain canopy and the forest structure. This would mean phasing out general-purpose harvesting in most rain forest areas or restricting logging to periodic low-intensity operations. Commitments would continue to be met in the subtropical rain forest, where economic logging was still ecologically acceptable, but these commitments would be reduced to match the capacity of the forest.

In the case of the coastal hardwoods, the policy was to manage those on the coastal plain for sawlogs and round timbers, and for recreation, the aim being to raise sawlog production during the next thirty years to the productive limit of the forest, regenerating it naturally where possible but supplementing this artificially where necessary to get maximum production of the most suitable indigenous species. The more mountainous, less accessible forests behind the coastal plain would be logged for sawlogs to the limit of economic accessibility while maintaining a forest cover, preferably of commercial material, but of any kind of forest if obtaining a cover of commercial species involved extra investment. In other words, the logging of the mountain forests is of recent origin, the growing stock is mostly mature and over-mature with a high level of defect, so that a sustained yield at present economic levels of logging is unrealistic, whereas, because of the many years of logging and management, the forests of the coastal plain have accumulated a wide range of size classes which can be stimulated within the next thirty years to provide good sawlogs. Therefore, the Commission argued that the mountain forests should be cut to the limit of economic accessibility for as long as possible while the coastal forests were left to build up before cutting was transferred to them. The organisation of major supply zones was to be such that long-term production would be concentrated in areas of good terrain and accessibility but, at least in the short-term, present commitments might have to be met from the mountains. Nevertheless, in any supply zone where the present commitment exceeded estimates of sustained yield, every opportunity should be made to bring them to balance.

Because of their generally low investment potential for hardwood production but general suitability for coniferous plantations, several of the areas of tablelands hardwoods have been the scene of plantation establishment for many years. The policy with these areas was to phase a decreasing harvesting of the hardwoods with an increasing production of softwood, but, in the medium term, the cut of hardwood might be increased to help meet the general deficit of sawlogs while ensuring an acceptable forest cover remained or would develop. Outside the zones of conifer plantation establishment, the existing crop would be logged to the limits of economic accessibility at a rate which could be sustained under extensive management. In the special

case of the alpine ash forest of the southern highlands, this would continue to be managed for the maximum production of sawlogs, extending the forest wherever suitable sites present themselves.

The aim in the cypress pine forests was to establish long-term supply zones in which sawlog yields could be set at sustainable levels and merchantable increment maximised through logging operations and some silvicultural treatment, with provision and control of grazing as an integral part of management. Those forests unsuitable for inclusion in such supply zones would be managed extensively, the primary aim being to retain a forest cover for environmental reasons.

Management of the river red gum forests was to continue on a multiple-use basis with diminishing wood production, present commitments of wood being met by selective logging.

The policies for these broad groups of forest and their interpretation into objectives of management for specific management areas were to be backed by a number of principles. For example, (i) in the long term, the yield from the forests was not to exceed their sustained productive capacity; (ii) efficient forest industries on which some decentralised rural economies depend would be maintained, but they would be rationalised in size and location to suit the productive capacity of the forest (the present level of cut not being sustainable in some areas), and every encouragement would be given to integrated utilisation; (iii) silviculture would be aimed at maximising increment on the growing stock which would be harvestable as sawlogs within the next thirty years, and those silvicultural processes requiring a high level of investment would be aimed at utilising intermediate crop products as well as sawlogs, particularly in cooperation with integrated industries; (iv) intensive timber production would seriously pre-empt other forest uses only in clearly practical and economic cases and in general the aim would be the provision of multiple benefits with the maintenance of the natural ecosystem (including preservation of examples of it), the amelioration or remedial treatment of the short-term adverse effects of wood production, the maintenance or development of a diversity of native species and age classes particularly directed at wildlife conservation, and the fostering of recreation.

Rain Forest

Although this justification of its policies for the management of the native forest was no doubt satisfying to the Commission, it did little to satisfy 'the environmental movement', which moved even more strongly to take issue with these policies and their implementation on several counts. One of these was the policy on 'rain forest'.

As Richards explains,[87] the term 'tropical rain forest' was coined in plant geography about the turn of this century to describe certain evergreen forests on certain soils of lowland areas of high rainfall in

the tropics. Characteristically, a great many species occur within a small area, the overwhelming majority of them woody, most of them of tree form, varying in diameter and height and usually making for several crown layers; climbers and epiphytes are usually abundant; and often associated with them is a wide variety of animal life. There are several extensive formations of this kind of forest; for example, in parts of Central and South America, tropical Africa, many parts of South-east Asia, and parts of Australia and the Pacific Islands. The apparent richness in both plant and animal life, and the density and structural complexity of tropical rain forest, form such a striking contrast to the temperate forests, which are the familiar background to much of the developed world, that they produce what Richards calls a 'fatal tendency to rhetorical exuberance' in the inhabitants of the latter, who describe it and think about it in 'a rush of superlatives'. As Richards further explains, the name 'rain forest' is also commonly given to various evergreen forest communities at moderate altitudes on mountains in the tropics (which he refers to as 'montane rain forest') and to evergreen forest communities in areas of particular soil and under particular rainfall conditions in subtropical climates in Asia, South America, South Africa, Australasia and Oceania (which he refers to as 'subtropical rain forest'). These are, by and large, variously less luxuriant, less complex, etc. than tropical rain forests but have some affinity with them by way of vegetative elements and structure.

In these terms there is, for obvious geographical reasons, no tropical rain forest in New South Wales. There are, however, in these terms, communities of subtropical rain forest, which the Commission recognises as such in its classification of the forest vegetation of the state,[88] classifying them into seven 'types' (according to the dominant vegetation) within a 'subtropical rain forest league'. These types tend to favour quite distinct sites within a general occurrence on 'coastal and escarpment sites on soils of high fertility (commonly derived from basalt or alluvium) in areas with ample moisture, and range as far south as the central South Coast but are best developed in the northern parts of the state. The Commission also recognises three other rain forest leagues, each containing several types, not all of which 'would be classed as "rain forest" in any comprehensive, worldwide classification of vegetation', but which show close affinities with rain forest communities and are a 'very distinctive and well-marked group'. Two of these leagues are called 'temperate rain forest leagues' because of their geographical location. By contrast with the Indo-Malaysian floristic affinities of the subtropical rain forest, the vegetation of the temperate rain forest leagues has floristic affinity with the Antarctic element. One of them, the 'warm temperate rain forest league' occurs in 'coastal and escarpment sites as far south as the central South Coast, but typically occupies sites which are either

cooler or located on less fertile soils than the subtropical rain forest league'. It has three types but is dominated by coachwood. The other, the 'cool temperate rain forest league' occurs in 'cool to cold, misty perhumid sites' and is composed of three types, with negrohead beech a characteristic species. The fourth league, the 'dry and depauperate rain forest league', is composed of a number of types all dominated by species with clear affinities to the flora that characterise the subtropical rain forest league and occupies distinct sites over a wide range of natural and artificial conditions.

As indicated above, these four leagues, which comprise a 'Rain Forest Group', occupy a small area in comparison with the forests characterised by a preponderance of species of the genus *Eucalyptus*, which the Commission classifies into about 115 types within thirteen eucalypt leagues. This 'Eucalypt Group' is characterised by an 'essentially autochthonous Australian floristic element, as opposed to the Rain Forest Groups whose floristic affinities generally lie outside Australia'. Much of this eucalypt forest is wet sclerophyll forest, described as 'tall forest (over 100 feet in height), frequently with a scattered understorey of small trees and with a mesomorphic shrub layer . . . and ground herbs'. Some of the wet sclerophyll types, which include much of the best commercial forest, have an understorey of rain forest species. The flooded gum type is one of these and, in the absence of any disturbance, the rain forest understorey in a stand of this type may develop to such an extent that the stand has to be classified as one of the subtropical rain forest types. Some of the wet sclerophyll types have brush box associated with them. In some areas the brush box predominates, with various typical wet sclerophyll eucalypts in association and an understorey of rain forest species. It is then categorised as 'inland brush box type', often forming an intermediate stage between flooded gum and rain forest.

Now whatever, as Richards describes it, the 'fatal tendency to rhetorical exuberance' on the part of many people where tropical rain forest is involved, not all of this response to it springs from mystique. It seems to many people that the tropical rain forests of the world should be conserved (in the fullest sense of the term) for a great number of very practical reasons. Instead, in recent years, destruction of the tropical rain forest in most of the main regions of its global occurrence has taken place on a massive scale in exploitation for wood, in clearing for settlement, crops, pasture or other wood crops, and so on. The speed and scale of this destruction of the global tropical rain forest has aroused concern on the part of many people in Australia for the fate of the rain forest of this country, which now represents only a remnant of its original extent. Unfortunately, generalising from the fate of the global tropical rain forest to the rain forest group in New South Wales (which includes no tropical rain forest) has introduced a certain amount of confusion into the criticism

which the conservation interests have levelled at the Commission, particularly as the Commission in its 'Indigenous forest policy' had proposed and was applying different management objectives for the different rain forest leagues within the group. Confusion became even more confounded when, because of the rain forest vegetation elements in its understorey, conservation interests began to label as 'rain forest' what the Commission was calling wet sclerophyll forest. Problems in communication between the Commission and its critics were increased by the difficulty of clearly defining forests characterised by ecological gradients and ecological transition. Where changes in soil and, to a lesser extent, changes in microclimatic conditions are abrupt, or where boundaries have been created by natural or artificial disturbances, the various rain forest and wet sclerophyll types referred to above may conform to the ideal and may be readily distinguished. More often, for various reasons, a forest stand does not conform exactly to a type: one type grades imperceptibly into another, and individual type areas are often so small in a large mosaic that for practical management purposes some individual areas may have to lose their identity. This problem in communication was to characterise the second of two major confrontations between conservation interests and the Commission over 'rain forest'.

The first major focus of contention was a group of state forests (Wiangaree, Roseberry, Mt Lindesay, Donaldson and Koreelah) in the far north-east corner of the state, with a total area of about 45,000 ha, about half composed of various rain forest communities, the other half of wet sclerophyll communities, forming one of the largest concentrations of forests of this kind in Australia. The area in which they lie is frequently referred to as The Border Ranges, a vaguely defined locality of generally broken, mountain land along, and contiguous with, the eastern section of the NSW–Queensland border. Wiangaree (one of the two largest, with an area of about 15,000 ha), which was to feature most in the contention, is contiguous with Lamington National Park on the Queensland side of the border. It was reserved as a state forest in 1917, only two years after the dedication of the national park. The rain forest at Wiangaree, as is generally the case with the other forests, includes subtropical, cool temperate and dry rain forest communities (there being no warm temperate) and some of the wet sclerophyll types characterised by rain forest understorey elements. Logging has been carried out in some parts since the latter part of last century, with formal records being kept since the 1920s. Parts of it have probably never felt the hand of European man at all.

As intensive logging led to the disappearance of red cedar throughout the state, interest gradually turned to other rain forest species, but, up to the late 1930s, most of the production centred on the hoop pine of the dry rain forest. With the development of mechanised equipment in the 1930s, which increased economic accessibility, with

the demand for special species such as coachwood and the use of other woods as substitutes for traditional imports during the war, and with the depletion of hoop pine, the utilisation of rain forest in New South Wales increased considerably. In 1953, the basis of allocating supplies of crown timber to industry was changed from rights to all wood on a particular area (irrespective of volume) to rights to a specific volume. These quotas were based on mill-log intake in the preceding few years and bore little relationship to the yield capacity of the forest. As a result, the quotas were well beyond the state's capacity to sustain them and, though every opportunity to reduce these quotas has since been taken, the incompatibility of quotas and forest capacity remains. This is a constant source of concern to the Commission and a constant source of ammunition for the Commission's critics.

In the 1930s little was known about how to perpetuate the rain forest after logging and, partly to divert claims for its conversion to agriculture, a program of clearing followed by planting with hoop pine was begun in some areas, along with research into the silviculture of the forest. By the time the hoop pine planting was phased out in the mid-1950s, because of its high cost, enough knowledge had been accumulated for the Commission to be reasonably confident that the subtropical rain forest could be harvested economically and successfully perpetuated under a regime of selective logging, whereas economic harvesting of the warm temperate coachwood stands usually required heavier logging, though coachwood could be logged selectively in cool temperate rain forest where it formed an understorey to beech. Continuing work since the 1930s had also shown that eucalypt stands could successfully be established, by seeding or planting, after the heavy logging of certain of the wet sclerophyll communities which had an understorey of rain forest elements, and also certain temperate rain forest communities. This was, in general, the basis for Commission practice into the early 1970s.

Starting from an individual expression of concern to the Commission in 1970 at visual and ecological effects of logging at Wiangaree, within three years the interest of a great number of people and organisations — local, regional and far-removed, private, industrial, commercial, bureaucratic and political — had become involved in a considerable conflict which revolved around the principle and practice of logging in the rain forests, and around alternative uses of the forests, particularly their dedication as national parks. This was not a new thought; in 1959 the National Parks Association of Queensland had unsuccessfully urged the New South Wales Department of Lands to establish national parks abutting Lamington.[89] In November 1975, the Commission documented its attitude to forest management in the McPherson Ranges.[90] It drew attention to the size of the area transferred to the National Parks and Wildlife Service, the area under its own preservation program and the area set aside for recreational

and aesthetic purposes under conditions of minimal disturbance. It rationalised wood harvesting on the remainder as meeting legal commitments to industry and as silviculturally acceptable.

A symposium sponsored by the Royal Society of Queensland and the Queensland Division of the Australian and New Zealand Association for the Advancement of Science (ANZAAS) in 1976 saw the use of the forest resource as only a part of the whole matter of land use in the region and helped bring this view to the government's attention. In August 1976, prompted by the Commission's seeking ministerial approval for the construction of major access to Lever's Plateau in Roseberry State Forest, the government decided to defer a decision on the matter pending an investigation by an inter-departmental committee. This committee submitted its report in September 1977. It drew up seven management options, ranging from full preservation to logging up to the limits of utilisation. In February 1978, the government referred this report to its State Pollution Control Commission, requiring it to consider the seven options, to inquire into the likely environmental, social and economic impacts of each, and, while considering any other factors it thought relevant, to recommend on the future management of the Border Ranges area 'having regard to the need to ensure the maintenance of employment within the area'. Prior to making its recommendations, the Pollution Control Commission was required to 'seek public comment and convene public round-table discussions'. The Pollution Control Commission published its environmental review in April 1978[91] and within a month the government had promulgated its recommendations for the reservation of a strip along the border as a national park, temporary logging of an area presently a flora reserve, compensation of a local sawmilling company to forgo logging quotas, and a coniferous afforestation program in the region.

Also in the north-eastern corner of New South Wales, to the south-east of Wiangaree State Forest, about halfway between the town of Lismore and the border and close to what was once one of the largest and most famous rain forest areas in the state, 'The Big Scrub', lie three state forests which occupy part of the Nightcap Range — Goonimbar, Whian Whian and Whian Whian East. These, with two other state forests to the north, form the Nightcap National Forest. Several streams rise in the forest on the southern slopes of the range, then run through cleared land and eventually to the Richmond River. One of these is Terania Creek, the upper part of which forms part of the boundary between the Goonimbar and Whian Whian State Forests. That part of the Terania Creek catchment within the state forest area began from early 1975 to be the second major focus of contention. The Commission classifies it as a mixture of subtropical rain forest, warm temperate rain forest and hardwood forest (dominated by eucalypts or brushbox, with or without an understorey of

rain forest elements). In the dispute that developed, it usually became generalised by most people as 'rain forest'. The state forests of the region had had a complex history, which included designation of part of them as a 'National Forest' during Swain's commissionership, a category of greater security than 'State Forest' and intended to provide an example of multiple use in action. The history included unsuccessful representations for designation of part of one of the state forests as a 'National Park' but subsequent reservation by the Commission of 'Flora Reserves' and 'Preserved Areas' and the provision of facilities for recreation. It also included periodic logging since 1940.

During the 1970s, for various reasons, including the availability of cheap land and a congenial climate, the region became popular as a place to settle for people seeking a different life-style from that of traditional Australian communities and with quite different value judgements (as has been well outlined by Prineas and Haigh).[92] In early 1975, the Commission advised local residents that, in line with the prescriptions of its indigenous forest policy for the various forest types involved, it would shortly be harvesting some of the forest area to meet legal commitments to industry. This was to be the beginning of a four-year period which commenced with consultation and discussion and developed into altercation and physical confrontation on a large scale as Terania Creek took on the elements of a religious crusade.[93] The government became split not only over solutions to the immediate problem but over the whole issue of a 'rain forest' policy. After field inspections in September and October 1979 by members of both the State Government and Opposition, for which the Forestry Commission was directed to prepare a general background paper on rain forest logging,[94] the government resolved that a judicial public review of the environmental factors associated with the proposed logging should be undertaken. It appointed the Hon. Simon Isaacs to conduct it. As a basis for the inquiry, the Commission was directed by the government to prepare a statement on the proposed logging,[95] and this was made public in mid-December 1979. The inquiry began in late December 1979.

Hardwood Woodchips

In late 1967, the New South Wales Government announced that an agreement had been reached with an Australian–Japanese company (Harris–Daishowa) to supply pulpwood from crown forests around Twofold Bay (south-eastern NSW) for conversion to woodchips for export to Japan. Although the cutting, splitting, breaking, exploding, shaving and grinding of logs into small pieces of wood or into wood fibres for the manufacture of paper, paper-board and reconstituted boards of various kinds had been going on in Australia commercially for more than forty years without adverse comment, although an

industrial plant had been producing hardboard from native forest material near Newcastle since 1939, and although particle-board from chips of radiata pine from the Commission's plantation was as common as cardboard or paper, this announcement triggered a conservation explosion, the reverberations of which still resound — and it provoked more governmental inquiry into the forestry sector in Australia than any other matter.

The native forests of the far south coast, stretching from the NSW–Victoria border to about Merimbula in the north, and from the coast to Bombala on the highlands to the west, cover an area approaching 250,000 ha. They are predominantly of the dry stringybark type of eucalypts with occasional moist sclerophyll gullies. Remote from the main markets, those parts relatively accessible were logged selectively for many years under very limited supervision. Because of their remoteness, the limited commercial interest in them, their inflammability and the dangerous fire climate that prevails over the whole of the south-eastern corner of Australia in summer, the area has a long record of destructive fires (particularly in 1939 and 1952). By the 1930s there were many such state forests in Australia composed of trees of several species, sizes and ages, with a long history of wildfire and selection logging. These forests carried a small amount of wood of sawmilling quality and had little chance of realising their wood-producing potential without intervention.

As a natural response to their charter to bring the whole forest estate to maximum wood production, foresters of the time actively sought to convert such 'degraded', 'depauperate' forests to a more productive status by introducing pulpwood operations that would remove most of the boles not suitable for sawlogs and provide a reasonably clear site for regeneration, at the same time providing some money (however little because royalty charges for such pulpwood would necessarily be low) for the regeneration procedures to be carried out. In his annual report for 1932, Commissioner Jolly recorded that the interest of Australian Paper Manufacturers (APM) had been aroused in the establishment of a pulping plant in New South Wales and that the company had investigated the potential of the crown lands between Twofold Bay and the Victorian border. It had also inspected the north coast between Coffs Harbour and Taree, and tested the pulping qualities of various eucalypts. However, 'the magnitude of the problem' prevented 'definite conclusions being arrived at without long and careful consideration'. In the event, the company decided to establish a pulpmill at Maryvale, in the Latrobe Valley in Victoria. From that time onwards, however, the increase in the productive potential of the far south coast forests that would result from comprehensive pulpwood harvesting was continually in the Commission's mind — and in the minds of others, too. For example, M. R. Jacobs, then Director-General of the Forestry and

Timber Bureau, had been invited by the Select Committee of the Legislative Assembly inquiring into the timber industry during 1965–67 to make a submission. He took the opportunity to reaffirm the opinion he had expressed for thirty years:

> If any post-graduate geography group were given the task of examining the Australian scene and recommending the most favoured region where a new province could be developed to cover all aspects of a well-diversified rural and industrial economy, taking into consideration soils for agriculture and forestry purposes, rainfall, access, a potential major harbour and, perhaps as important as anything — industrial water within a reasonable distance — the group would come up with the answer that Bombala–Eden–Twofold Bay district is the region.

By the mid-1960s, Japanese entrepreneurs were canvassing the possibilities of obtaining Australian eucalypt fibre for their burgeoning pulp and paper industry, which already drew heavily on suitable sources of raw material all around the world. Their interest in the Eden area provided the Commission with the opportunity it had long sought to convert the 'unproductive' forests of the Eden area into 'productive' ones — by a large-scale but otherwise routine harvesting operation which would lead to considerably enhanced forest productivity in the future. The agreement between the government and Harris–Daishowa required that the company establish a chipping plant and wharfage facilities on the southern entrance to Twofold Bay (opposite the town of Eden), and obligated it to show cause within a certain time why it should not establish a pulpmill for local conversion of the chips rather than exporting them. Logging started in 1969 and the chipmill commenced operations in November of that year, being officially opened in May 1971 (by which time it had become wholly Japanese owned). The first shipment of chips to Japan took place in January 1971.

Until the 1960s, only a comparatively small area (about 60,000 ha) of the extensive forested crown land in the area was state forest. Shortly after World War II, the Commission carried out resource surveys of some of the other crown area and sought unsuccessfully to have parts of it dedicated as state forest. During the late 1960s, the government directed land-use surveys to be undertaken by the Forestry Commission, the National Parks and Wildlife Service, the Soil Conservation Service, the Water Conservation and Irrigation Commission and the Lands Department. As a result, the government extended the area already under the control of the National Parks and Wildlife Service (including revocation of about 10,000 ha of state forest) and also extended the authority of the Forestry Commission by an area of about 140,000 ha, most of which was dedicated as state forest, with a view to ensuring future supplies of logs for the

established sawmilling industry at Eden and Bombala and future supplies of pulpwood for the new woodchip industry at Eden.

Given the extensive nature of the forest and the price the Japanese were prepared to pay for the wood, it was inevitable that the Commission would regard the operation as one which required keeping costs of management as low as possible while ensuring adequate natural regeneration. This meant felling everything that was merchantable either as sawlogs or pulpwood (except clumps of already established regrowth) since this was both the most economic method of harvesting and the method most suited to the silvical habits of the species. For economic reasons too, the felling areas (coupes) were to be as large as possible.

The change in scene which woodchipping brought was an abrupt one. Hitherto, logging operations for sawlogs had been selective and mainly far removed from general sight, and, as a result of the sporadic, selective logging and occasional wildfires, the forest presented what to many was an attractive mosaic of trees and shrubs of different ages, sizes, shapes and colours. The large-scale clear-fellings of the woodchip operations were, by contrast, cataclysmic. These forests were on or near a major highway between Sydney and Melbourne and much of the region had become a source of recreation for people from those two cities and from Canberra. Because of their size and locations, the woodchip operations were thus much more evident to a greater number of people than the previous sawlog operations. By this time, there had also developed in Australia fairly pervasive resistance to any further 'selling off the farm' and a particular reaction had developed in some quarters against the export of any further raw materials to Japan and contributing further to its spectacular post-war development. The total effect was to bring about a strong opposition to woodchipping on the part of many people — an opposition represented in considerable detail by R. and V. Routley.[96]

From the start of logging at Eden, those opposed to it sought every opportunity to bring their views to the attention of the public, bureaucrats and government. The first major opportunity to do this was when a Select Committee of the House of Representatives was appointed in June 1970 to report on, amongst other things, the adequacy of the various systems of reserves for ensuring the preservation and management of at least minimum areas of the major animal habitats of Australia. By this time, programs for the export of hardwood woodchips were also under way in Tasmania and Western Australia, and the extent of the objections to woodchipping prompted the Select Committee in its report in 1972 to view woodchipping and the expanded coniferous plantation program as 'the two most contentious issues involving forestry controlled areas'. However, it limited its reaction to recommending 'that before further native forest is set aside for woodchip purposes, surveys be carried out to assess the value

of such areas for wildlife conservation'. The Committee of Inquiry into the National Estate in its report of August 1974 took strong objection to the hardwood woodchip export programs and recommended 'that woodchipping operations . . . be discontinued until the environmental effects are better known and properly assessed'. A report by a Working Group on Rural Policy in Australia to the Commonwealth Government in May 1974 pointed out that there were certainly many gaps, some of them very large, in environmental and economic knowledge in connection with woodchipping and urged that, while woodchipping should continue, as many as possible of the obvious gaps in knowledge should be filled as soon as possible.

The Commonwealth Labor Government elected in 1972 had espoused a concern for the environment as a specific plank in its election policy and in mid-1973 set up an inter-departmental working group (from the Forestry and Timber Bureau, the Bureau of Agricultural Economics and the Department of Environment and Conservation) to report on woodchipping. The report, presented in mid-1975,[97] was thorough, competent and professional but did nothing to reduce the clamour that was raging around the industry by this time. To conservation interests, it was naturally an in-house investigation which took the making and export of woodchips for granted and merely set out to rationalise this. The starting point for the opposition was no woodchipping at all, and it would be satisfied with nothing else but a full-scale public inquiry to which its arguments could be presented with a chance to hold the day. Under considerable pressure from this section of the public, from environment-minded members of its own political party and from government members in marginal electorates, and sensitive to the need to keep faith with the concern it had expressed when it formed the Opposition in Parliament and in its pre-election policy, the government promoted an inquiry into 'the impact on the Australian environment of the current woodchip industry program' by the Senate Standing Committee on the Social Environment in November 1974. With a change in government in November 1975, the inquiry was taken over in March 1976 by the Sentate Standing Committee on Science and the Environment.

After an interim report recommending renewal of the Harris–Daishowa export licence, which was due to expire at the end of 1977, the committee tabled its main report in May 1977. It contained a great number of conclusions, recommendations regarding aspects within the federal sphere, and proposals regarding matters germane to the states. The committee also showed unusual persistence in pursuing the matter and, early in 1978, contacted the various bodies to whom it thought its recommendations and proposals were relevant. It recorded an excellent response from them, issued a supplementary report and seemed to feel that some progress, at least, had been made in allaying public disquiet.

Certainly the Forestry Commission and the company had effected changes during the decade since woodchipping had first started in the Twofold Bay area. Some of these probably resulted from the 'conservation pressure'; some resulted from the extra pressure of the Senate inquiry; some undoubtedly would have been initiated by the Commission and the company on their own account, given time and a better infrastructure. The expansion of the road system, for example, allowed a considerable reduction in the size of the coupes, and this in itself removed the source of a great many of the objections.

When logging first started, the Commission did not have the time, the funds or the staff to carry out the appropriate planning and the road works programs necessary for the effective running of the operation, nor could it meet the new demands sections of the public were propagating for the protection of the total physical environment. Because of the limited road network, the logging had to be concentrated and kept close to the chipmill. Therefore, the early coupes were sometimes as large as 800 ha (roughly 3 km square) and the adverse visual impact was enormous. Because of (for various reasons) a low standard of haulage operations and few Commission staff to exercise supervision and control, it was difficult to refute charges that this sort of clear-felling must lead to soil erosion and impoverishment, to unstable ecosystems, to destruction of wildlife, and so on. Bad fires in 1972 and the need to salvage burnt stands before they deteriorated affected the planning, which was by then leading to considerable improvements in operations. Gradually the size of the coupes was reduced to 200 ha and eventually to an average of about 10 ha. With time, the standard of the hauliers and their equipment improved; labour turnover, which was high at the beginning, was considerably reduced and the standard of skill raised by training; and improvements in the processing of the material led to improved utilisation and a reduction in the size of logging dumps and bark-disposal areas. With an increase in Forestry Commission staff in the area (from about 5 to 100 over the decade), there was enormously increased scope for research and control. The evolution of woodchipping during the period, the effects of it on the physical and social environment, and on the Commission and the industry, and the factors that have contributed to these effects have been examined in detail, from a Commission viewpoint, by Nicholson and Beath.[98]

In the general consideration of Australia as a source of woodchips for export, the North Coast also came under scrutiny in the mid-1960s. By the mid-1970s, firm proposals were being put forward by entrepreneurs. These plans were immediately challenged by various sections of the public because they saw them as being a repetition of what had been objectionable about the Eden project. To reduce some of the confrontation and try to avoid the long-running disputes that had characterised woodchipping on the far South Coast,

the government referred the matter to the State Pollution Control Commission and the State Development Coordinating Committee for consideration in late 1974. An environmental inquiry was promulgated to which proposals for woodchipping and environmental impact statements covering them were invited. These were subsequently displayed for public comment.

Whereas the project at Eden depended primarily on material coming directly from the forest with a supplement of sawmill waste, the proposal for the North Coast was for sawmill waste as the main material supplemented by 'forest residue' composed of (i) 'logging waste', the remainder of a tree felled for logging after the commercial sawlog had been removed, and trees felled for sawlogs but found on felling to be unsuitable for that purpose; (ii) 'plantation clearing residue', material felled in clearing native forest for pine plantations; (iii) 'silvicultural residue', malformed or defective trees unsuitable for commercial use as sawlogs, poles, sleepers, etc. which could be removed to the advantage of the remainder of the stand; and (iv) 'regrowth thinnings', small trees removed from regenerated or planted eucalypt stands for silvicultural purposes. In a statement of its attitude to the proposals in February 1975, the Forestry Commission placed various qualifications on the supply of this kind of material. Although it saw no problem in providing limited amounts of clearing residue each year, it had doubts about the economic feasibility of removing most logging waste and silvicultural residue and felt that to thin regrowth economically would be unacceptable environmentally. Its general view was that first priority on the North Coast should be given to existing commitments for sawlogs and that it should not become involved with anything that could prejudice this, and that its obligation to ensure high environmental standards in the continued provision of other benefits such as water, recreation and wildlife to the area would make the supply of forest residue for woodchipping uneconomic. In brief, though the Commission saw considerable merit in a woodchip project based on sawmill waste, it saw strong environmental and economic reasons why it should not be involved in more than a very limited way.

The State Pollution Control Commission reported in November 1975 that the conversion of sawmill residue was desirable from the viewpoint of reducing waste and the conversion could be made environmentally acceptable, that removal of residue from the forest under the control of the Forestry Commission could be expected to be environmentally acceptable, but that there were insufficient statutory powers to ensure this on private land. The possibility of large-scale clearing of private land, with limited attention to regeneration, which was associated with the woodchip industry in Tasmania, was one of the major concerns of those opposing the scheme. It also recommended the port of outlet be Brisbane or Newcastle (not Coffs

Harbour). In May 1977, the government announced that any such industry must be based on sawmill waste and logging waste. In November 1977 a consortium submitted an environmental impact statement of a proposal. After public submissions relating to the proposal had been considered by the Pollution Control Commission, the government approved a proposal in May 1978 involving only sawmill waste or logging waste obtained from land under the control of the Forestry Commission, with Newcastle as the preferred port.

Coniferous Afforestation

Ednie Brown had established conifer arboreta in various parts of New South Wales in the 1890s, but the first plantation of any size was established on coastal sands at Tuncurry (on the north coast near Taree). In 1911, a nursery was established there (and another at Armidale), and, in the same year, the Director (Dalrymple Hay) visited New Zealand 'to inquire into the system of forest work by prison labour as applied in that Dominion' and to report on 'the Penalogical and Forestry phases of this question'.[99] By the time he presented his annual report of 1912, about 32 ha had been planted with pine and preparation was being made for the establishment at Tuncurry of a camp of 'good conduct prisoners' and the clearing of 200 ha for planting. By the end of 1914 the Director was able to report: 'a total of 73,196 trees has been planted out in the area. The health of the prisoners has been excellent, their conduct good, and the scheme has so far proved a great success'.[100] Thus began the first plantation, and the first liaison between the penal and forestry arms of the government, which persists to the present day. (By the time planting ceased in 1934, owing to the poor establishment and low growth rates, about 800 ha of pine, mainly radiata and pinaster, had been planted. The plantation was destroyed by wildfire in 1939.)[101]

During the next few years, small plantations of various pines, but particularly radiata pine, were established at various spots, at first along the coast and as near as possible to Sydney (which was the major market), but later in areas of higher rainfall and better soils in the tablelands and highlands. By the 1920s, the heads of the State forest services had agreed on coniferous afforestation as a matter of the highest priority. The planting rate was increased in New South Wales and was concentrated in the southern and central tablelands, where not only were the sites showing themselves more favourable than anywhere else but there promised to be sufficient land for the state's share of the national target that the service heads saw as necessary for future needs. In an extensive review of the situation in his first annual report in 1927, Commissioner Jolly saw 'the snowbelt in the southern highlands, . . . however long delayed, . . . [as] destined to be the future coniferous belt of New South Wales'.

At the close of the 1935 season, when planting was suspended (except at the several prison camps then in operation), there were more than thirty plantations with a total area of about 16,000 ha, but many were far from successful. Most of those on the coast were on infertile sands, and many of those on the tablelands had been established on land dedicated to forestry because it was too poor for settlement or on areas of poor native forest, the productivity of which the Commission had sought to improve by coniferous reforestation. Exposed to the view of a section of the public already antagonistic to the planting of exotic conifers in principle, and particularly opposed to the removal of native forest for the purpose, the failures brought a direction from the government to cease planting pending a thorough stocktaking of the existing plantations and consideration of the future in the light of it. The review showed that some stands, especially those on the coast, were far too poor to retain; some were good enough to retain but not to extend; and some, especially those on the better soils on the tablelands, were good enough to warrant extension. By this time, World War II had intervened and planting was not resumed until the mid-1940s. Lack of imports during the war forced industry to adapt to the plantation material as the nearest alternative to northern hemisphere conifers, and some clear-felling of the failed plantations, together with some thinning of plantations that had been recommended as likely to respond to silvicultural treatments, was carried out, which might never have been done otherwise on economic grounds.

In the late 1950s, as part of its ten-year program, the Commission reaffirmed its policy of thirty years earlier — state self-sufficiency in wood through intensive management of the native resource and a vigorous softwood plantation program. For the next few years, continuing exercises (by the state on its own account and in cooperation with the other states and the Commonwealth) in estimating future demand and supply of wood continued to raise the total target and the annual planting rate. When the Australian Forestry Council decided in the early 1960s that top priority should be given to establishing a national softwood plantation resource of about 1.25 million ha, New South Wales, because of its location, population, and the availability of land, saw itself as providing about one-third of this total. It was also a willing participant in the Softwood Forestry Agreements Act of 1966 which provided a Commonwealth Government subsidy for an enhanced planting rate to meet this target.

In the early years of planting, one of the main reasons for the dispersed plantations was the provision of wood for local markets. Gradually, as other factors became influential, planning turned to fewer and larger areas, and by the early 1960s planting was being concentrated in five major areas, mostly on the tablelands, to suit the economics of modern, integrated wood-using industries. In 1964, for

example, the commission announced a twenty-five to fifty year program for an eventual 40,000 ha plantation in the Bombala area, the clearing for which was eventually to become part of the wood supply to the Eden woodchip project.

For the next twenty years after planting recommenced in the mid-1940s there was little questioning by the public of the government's policy for an extensive coniferous plantation program. Then, almost suddenly in the 1970s, it became a controversial issue in all the states, though more so in New South Wales. The escalation of the planting program throughout Australia coincided with an increase in public awareness of the environment, of increasing resource development, and of the effects of resource development on the environment. The location and scale of the clearing and planting operations exposed them for the first time in two decades to a wide public view and many objections began to be levelled at the planting program.

One group of objections revolved around the need for the program itself. The historical rationale for the program would, in simple terms, go something like this. For many purposes for which wood is used, a soft, light, easily worked wood (typical of many conifers) is more suitable than a hard, heavy one, which is difficult to work (typical of many broadleaved trees). Australia had and still has a considerable amount of the latter but had little of the former and, very early in its history, began to import coniferous wood to meet public demand for it in the form of both raw material and the products made from it. For various reasons (some of which have persisted and some of which have changed with the times), many foresters have agreed, and governments have accepted, that the equivalent of this imported material should and could be grown in this country; and, since about the turn of the century, conifers have been planted in Australia to this end — very largely exotic conifers, which are much more productive in the circumstances than native ones.

Forestry authorities have forecast the amounts of various kinds of wood and wood products that future populations are likely to consume, based on forecasts of population numbers and structure by appropriate demographic authorities, and based on assumptions about the need of those populations for particular kinds of wood and wood products and on assumptions about the price of these materials at the time. They have forecast how much of this is likely to be available from the native estate, and, having noted the size and nature of the deficit between likely consumption and likely availability from the native estate, have planned the coniferous planting to meet it. In other words, they have assumed, with a government assent which has varied from whole-hearted to qualified, that they should try to organise a self-sufficiency of wood and wood products, and that the best way to do this is through conifer plantations.

Amongst the reasons advanced for this policy are (i) that it will be difficult or even impossible to import wood and wood products in the future because they will no longer be available from either the traditional or alternative sources of supply, or supply will be so reduced or demand so high that prices will rise beyond the public's capacity or desire to pay; (ii) that Australia is vulnerable to restriction of imports in times of martial or economic crises; (iii) that the cost of imports is an economic burden which Australians do not have to support because we can grow what we need at least as cheaply as it costs to import; and (iv) that local growing supports rural employment and promotes advantageous distributional effects in rural areas by providing sources of raw material there to which industry, otherwise located near ports of entry (usually cities), can be encouraged to move. It was on the basis of these sorts of arguments that the Commonwealth Government provided funds for an accelerated program by the several Softwood Forestry Agreements Acts.

To these arguments the critics (who include some foresters) variously respond that the rationale for self-sufficiency is unconvincing on numerous counts, particularly self-sufficiency for each state within itself. They claim (i) that even if a policy of self-sufficiency were justifiable, the forecasts of population and consumption are too high; (ii) that there is insufficient evidence, particularly regarding the cost of growing the material, to justify the program on economic grounds or to justify an assumption that a surplus can be satisfactorily exported if the program does result in over-supply; (iii) that the contribution of the cost of importing wood and wood products to the total national import bill is relatively small and is not a problem in balance of payments, particularly under present fiscal controls; and (iv) that there are strong economic, social and political arguments involved in the principle of trading that are applicable in this case.

Another group of objections revolved around the likely adverse effects the program would have on the physical environment. For example, (i) native (normally eucalypt) forest is replaced with pine forest, which is less attractive, a poorer habitat for fauna and other flora, a poorer catchment in respect of water quantity and quality, and likely to cause soil degradation; (ii) for successful establishment and growth, pine plantations require the support of fertilisers, herbicides, fungicides and insecticides, all of which are likely to have side-effects on the environment or on people; and (iii) the clearing for the plantation establishment and associated road works may result in erosion and adverse effects on water supplies.

The conventional response to this is that some people prefer pine forests to eucalypt forest (particularly poor eucalypt forest), from an aesthetic point of view, and the former often provide a better opportunity for certain forms of recreation than the latter. In addition, although the faunal and floral composition certainly

changes, pine forests soon develop rich faunal and floral populations of their own, often richer than the original. Water up-take by the crop may for a time be greater with pines than with eucalypts but the overall advantages to the catchment of pine canopy and litter over that of eucalypt canopy and litter outweigh that preliminary disadvantage. Soil erosion can be avoided under proper control and soil degradation (or reduced productivity) is restricted to certain originally poor soil types, and the reasons for this are being understood, and steps taken to counter it. (Both this group of objections and the one referred to above have been extensively argued by R. and V. Routley.)[102]

The first formal opportunity for critics of the afforestation program to voice their objections was the inquiry conducted by the House of Representatives Select Committee on Wildlife Preservation in 1970. These objections were wide-ranging but, having to restrict itself to matters germane to its terms of reference, the committee limited itself in its report of 1972 to the recommendation that 'serious consideration be given to converting suitable uneconomic previously forested farmland to coniferous forest rather than clearing additional native forest for this purpose' on the grounds that this avoided the loss of native forest with resultant loss of wildlife. In fact, all the forest services, and the New South Wales service in particular, have from the earliest times pursued a policy of buying and planting such land to the maximum extent that it has been available in the right kind, size and location, to the extent that they have had access to funds for that purpose, and the extent that the political climate has been favourable to doing it. Such a policy of land purchase was inevitable. The forest services needed very large areas of land for the plantations. State forests, by the nature of their dedication, tend to be relatively small and scattered. There was rarely, in a state forest, a large enough area both suitable for conifer planting, and more suitable for conifer planting than retention as productive native forest, to make an effective plantation. It was therefore essential to add to whatever land was available for a plantation in a state forest any suitable land that had reverted to the Crown (as it did for various reasons) or to purchase suitable land that had failed in agriculture or that the owner was happy to sell at a suitable price. The Commission estimated in 1970, for example, that about three-quarters of the 80,000 ha of plantation estate had previously been used for agricultural or pastoral purposes, and that, in the previous twenty years, it had purchased something like 56,000 ha.[103] The provision of funds for land purchase was an essential feature of the Softwood Forestry Agreements Act.

Nevertheless, there are problems in, and opponents of, this policy. Like other government agencies, forest services do not pay local rates or taxes, and local government authorities view large-scale trustee-

ship by forest authorities with jaundiced eyes unless the benefits outweigh this disadvantage to them. Again, a large absentee owner may contribute little to the culture and welfare of the local community, and reluctant land-owners may resent real or imagined pressure to sell. In some cases, 'failed agricultural land' carries fine eucalypt regrowth, which poses a dilemma. The demand by critics of the program that long-term agriculture with pine should provide an economic return on land that was not able to provide an economic return with short-term agricultural crops also presents the forester with something of a paradox.

The kind of conflict over pine planting, the kind of objections voiced, and the slow progress of the resolution between the Commission and critics of its policy are very well illustrated in what became known as 'The Boyd Plateau' case, for which the Australian Conservation Foundation has presented one side of the picture[104] and the New South Wales Forestry Commission the other.[105]

Multiple Use

Forests, by their nature, have the potential to provide a great many values, benefits, services, uses and products. They are a critically important element of the general environment of living things, a habitat for many of them, a source of protection for some of them from others, and from other elements of the environment. They are a source of goods for man (e.g., water, wild and domestic animals, plant products of various kinds) and they form a source of aesthetic, emotional, spiritual or recreational experience, and a source of curiosity and scientific interest. In brief, forests have the potential for multiple use, and this has been recognised for a very long time.

People living in or near a natural forest have from the earliest times taken advantage of whatever benefits it provided. From the first understanding of how forests could be manipulated for various uses, people have managed natural forests to suit their needs and have established forests artificially for similar purposes. It has also been recognised for a very long time that, for some benefits, forests have to be manipulated very deliberately but that certain other benefits may come without such management, and that, whereas some uses are compatible with each other so that two or more of them can be provided on a small area of a forest either at the one time or at different times, some uses are quite incompatible with each other either in place or time. This being so, managing a forest for multiple use involves several major steps in planning. Firstly, there has to be an investigation of the potential supply of benefits from the forest and what has to be done to realise them; secondly, there has to be an investigation of the demand for such benefits; thirdly, a decision has to be made, on whatever grounds or whatever criteria are appropriate, about what benefits will be supplied and how they will be supplied —

in particular, whether some uses will have priority over others and what the order of priority will be.

By the late 1960s, the Commission began to be charged by its critics for not having a policy of multiple use, or, if it had such a policy, for not implementing it. Such a policy, they implied, was something which might in any case be expected from a professional forest service as a natural corollary of its responsibility for the public forest estate, but it was now mandatory in terms of society's new awareness of the need for the conservation of natural resources. The Commission's response was to point out that in fact it had had a multiple-use policy for a very long time, that it had been implementing that policy for a very long time, and that it was implementing it at present. The response of the critics was that what the Commission was implementing was not multiple use. By the late 1970s the issue continued to be disputatious and promised to remain that way, with an inevitably increasing demand by the public on the forest resource for more goods and services.

It has been apparent throughout this period that there are two parts to the issue. One lies in different interpretations of the concept of multiple use or its practical implementation. The common professional interpretation of multiple use is to put a forest to more than one use (or to provide more than one value, benefit, service or product) over space or time. Since the large number of possible uses are not all intercompatible, in practice multiple use usually means zoning the forest in some way at a particular time and allocating priorities of use variously to the zones according to their suitability for use and the relative demand for such uses. In some cases this may result in single use in some zones, though other benefits may flow without deliberate management for them. In time, the priorities of use in the various zones may be reordered. A common lay interpretation of multiple use is the provision of more than one use from all portions of the forest all of the time. The other part of the issue lies in the nomination of possible uses and the ordering of priorities. To this extent, the disputes about multiple use have the same basis as the disputes about rain forest, woodchips and pine planting — they are about individual or group values.

The New South Wales forest service could, in fact, claim an awareness of, and a practical interest in, the multiple benefits of forests stretching back to its first Director-General, Ednie Brown, who was an ardent believer in the manifold virtues of forests, as his earliest reports to the government attest. Indeed, the introductory section of his first annual report to Parliament in 1890 reads like a textbook on forest use and influences. So ardent was his belief in one of those virtues — namely, the efficacy of forests in inducing rain in a locality — that his previous appointment as the first Conservator in South Australia had been jeopardised because of it. The next head of

the service, Hay, put 'the preservation of forest cover on mountain ranges for hydrological purposes' high on the agenda of the first Interstate Forestry Conference in 1911 and led submissions by the various forest services to the Royal Commission on the Constitution in 1927 on the whole question of the valuable protective role of forests in Australia.

In 1935, State Parliament amended the Forestry Act in two ways directed at multiple use. One was for the declaration of 'National Forests', which were designed 'to serve the community in a five-fold purpose viz. (1) to produce timber . . . (2) to protect our watersheds . . . (3) to develop the recreational values of the native woodlands . . . (4) to conserve the wildlife of the bush . . . (5) to utilise the incidental grazing values of the forest'.[106] There is little doubt that these intentions were coloured with an attempt to provide a more secure reservation against a possible take-over for agricultural selection than was provided by the legislation covering 'State Forests'; revocation of a national forest required an Act of Parliament, whereas revocation of a state forest merely required resolutions of both Houses of Parliament. Also, in the case of the second national forest, Nightcap, its dedication provided a compromise between retaining much of it for wood production and losing it all if it were reserved as a national park. Nevertheless, the intentions were sincere enough in both these cases, and certainly in the case of the numerous other forests so dedicated, because they conformed to the reigning social philosophy, as expressed by government, that the prime use of the forests of New South Wales should be to produce wood. Forests were also indispensable to the protection of catchments, but the wood-production function could be carried out without impairing the properties of the forest for catchment purposes, recreation, wildlife conservation or the grazing of domestic animals. It was considered that wood production would very likely impair the preservation of the native flora and, for that reason, the 1935 amendments to the Act included a provision for the setting aside of areas of state forest as 'Flora Reserves', revocable only by Act of Parliament. For various reasons, not all of the good intentions for the national forests have been realised, but there has been a continuous program of searching out suitable areas and dedicating them as flora reserves, so that by 1978 there were forty-one such reserves with a total area of about 10,000 ha.[107]

This legislation for flora reserves provided an opportunity to reserve areas of undisturbed (or relatively undisturbed) forest that form a link with pre-European settlement, that represent the original habitats of Australian flora and fauna and are a sanctuary for those habitats which might otherwise be threatened with extinction, and that form a source of passive recreation for the public. In 1965, on the recommendation of its Research Committee, the Commission began

an internal Native Forest Preservation Program aimed at reserving under the flora reserve legislation examples of all the major native forest types in the state for scientific use; for example, to help understand growth processes in the natural forest and to act as a reference against which the effects of management on such types could be compared. As such, these reserves need to be of a certain minimum area, of a certain shape, presently undisturbed, and buffered against future external (including human) disturbance. Field staff propose areas for consideration, and those that are regarded as suitable are classified initially as 'Forest Preserves'; then, as opportunity permits and the legal reqirements are fulfilled, they are notified as 'Flora Reserves'. In 1978, there were ninety-nine areas totalling more than 10,000 ha in this 'holding' category.[108] Some flora reserves are zoned so that they meet both scientific and recreation needs.

In view of its public declamations on the hydrological importance of forest cover going back fifty years to Hay's time, the Commission obviously needed no reminding of the possible deleterious effects of various operations on those forests under its authority which form catchments for domestic or industrial water supply. However, the charges of the 1960s that some of its operations were imperilling catchment properties prompted it to set up a special research program to provide firm data on the effect of its operations (such as harvesting and litter-reduction burning) on water quality and soil erosion. This program resulted in the formal promulgation of prescriptions which its employees and contractors must observe in such operations.

Grazing of domestic animals on the forest was recognised as a natural forest use in Brown's first annual report, which meticulously recorded the number of occupation permits and the royalty they brought in. Ninety years later, in 1981, there were nearly 700 occupation permits for pasturage, spread over more than 400,000 ha; 230 forest leases for grazing, covering about 230,000 ha; and 900 grazing permits for short-term agistment were issued in that year. The total royalty from grazing for the year was nearly $250,000.[109] Although grazing has always been regarded as compatible with the production of wood in principle, the practice has not been without problems. When the policy of complete protection from fire was in vogue, the grazier had to be firmly educated out of the traditional burning of the forest to induce growth of new grass. With the swing to litter-reduction burning, the Commission had to be equally firm in retaining responsibility for this.

Through forestry legislation and associated fauna-protection legislation, state forests protect the fauna on them against interference by man. Foresters in New South Wales, as elsewhere, have for a long time seen this as an 'incidental use' associated with wood production and have seen the reservation of flora reserves and the like, with their

attendant conservation of fauna and fauna habitats, as a further exhibition of a multiple-use policy. However, because the Commission was being continually criticised for not paying adequate attention to fauna conservation on a wider scale and for not taking account of the potentially harmful effects its harvesting, silvicultural and plantation-establishment operations were having on natural habitats, in 1975 the government provided funds for the appointment of a wildlife biologist. The Commission now had the opportunity to begin a comprehensive program of research on forest fauna on its own account and in conjunction with various other institutions. Short-term training programs in the integration of fauna conservation in the planning and implementation of general operations were also set up for district staff.[110]

The use of the forests for public recreation had been given formal recognition in the 1935 legislation and, from that time onwards, the Commission put as much effort into meeting the limited public demand for recreation as it thought was compatible with its major charter for wood production and the continual shortage of funds. Small areas were set aside for public purposes, particularly in response to local pressure, and, as travel by motor vehicles became more prevalent, road-side picnic spots were established in many forests. As public demand for recreation increased, more of these picnic spots, backed by an attractive area of forest for viewing or walking, were established, particularly near major population centres. In the early 1960s, a move was made in a few places to provide more substantial visitor facilities in the form of forest parks. By the mid-1960s, the pressure for forest-based recreation had swelled considerably. An increasing population with more leisure time, more affluent and mobile, better educated, more conscious of the need for relief from urbanisation and in a better position to meet it, was turning to the natural environment for recreation.

Arising out of an internal consideration of what its attitude to this increasing demand for recreation should be, the Commission circulated a set of 'principles' in 1969 for the guidance of its staff and with a view to formulating a policy from them. In preparing these principles the Commission gave consideration to the kinds of recreation that were possible and appropriate in the various forests of the state, to how compatible these various forms of recreation would be with other forest uses (within a management framework of multiple use), to its rights and responsibilities as a landowner and occupier, and to the rights of the public in respect of public forests. In 1971 the Commission outlined the philosopy behind these principles and an analysis of what appeared from experience to be the most popular forms of forest recreation. By this time it was clear that a more explicit recognition of recreation as a forest use was needed and, in the several amendments to the legislation in 1972, the 'objects' of the

Commission were extended by a clause which read: '(e) Consistent with the use of State forests for the purpose of forestry and of flora reserves for the preservation of the native flora thereon (i) to promote and encourage their use as a recreation'. Recreation thus became a formal part of the Commission's charter.

In 1973, following this legislation, the Commission issued a statement regarding recreational use of state forests in which the major thrust of its policy was clarified. It was not interested in providing 'wilderness' — the type of recreation provided by national parks — although many people were demanding that. This was incompatible with wood production, which was the Commission's main concern. The Commission saw its role as complementing, rather than duplicating, the work of the National Parks and Wildlife Service and, while developing state forests for recreational use, would aim to 'highlight, not hide, [their] value as producers of timber and other benefits to the whole community'. Its 1976 statement on indigenous forest policy reinforced its view that its charter required it to put timber production before other uses in all but minor cases; where the 'dominant use lay in scenic or nature conservation plus recreation', it saw management control and land title more appropriately vested in the National Parks and Wildlife Service. In a more orderly re-statement of its policy in 1980, it noted 'greatest emphasis in recreational planning and development shall be given to the free use of State Forests for their intrinsic recreational worth and facilities provided shall recognise primarily driving, picnicking, camping and walking'.

Formulating a policy with government approval and getting funds to implement it were, of course, two different things, and the Commissioner continued to point out in his annual reports of the 1970s the difficulty of keeping house as housekeeping costs rose rapidly in the inflationary spiral of the time — in particular, of meeting the ever-increasing demands of the public for recreational use of the forests. Nevertheless, in the annual report of 1978–79, the Commission could claim some thirty sign-posted forest drives, ten rest areas on major roads, about a hundred well-established picnic sites, and an annual expenditure on establishment and maintenance of such facilities well in excess of half a million dollars.

CHAPTER 2
Tasmania

First Settlement and Timber Operations

In September 1800, King replaced Hunter as Governor of New South Wales. As interested to expand the colony geographically as he was to put it on its economic feet, he pressed the British Government to settle Van Diemen's Land (as it was called until 1856). With French explorers taking an interest in the place and his earlier commission to settle Norfolk Island as a security against them still fresh in his mind, he sent Lt. Bowen in 1803 to establish a settlement on the Derwent River at Risdon's Cove, which had been spoken of favourably by Flinders and Bass. Commissioned by the British Government to form a settlement at Port Phillip, Collins, a former Deputy Judge-Advocate of New South Wales, settled there in 1803. Disappointed with the site, he moved to the Derwent and established Hobart Town on Sullivan Cove in February 1804, after which the settlement at Risdon was closed down. As a result of his urging, the British Government instructed King in June 1803 to send Lt.-Col. Paterson to found a settlement on the Tamar River in northern Tasmania, and this he effected in 1804. For some time, the two commands were separated at the 42nd parallel as two counties, but in 1812 they were united under one Lieutenant-Governor subordinate to the Governor-in-Chief at Sydney.[1]

If King had one eye on the French, he had the other on timber. He asked Bowen to let him know 'whether the general timber in that country is fit for the purposes of being sent to England for the construction of King's ships', the species, their sizes and accessibility,[2] for many of the earlier navigators had reported enthusiastically on the large trees growing right up to the water's edge, particularly in the many deep bays and rivers of the south. From the days of the first settlements, timber-getting became an important activity.

At first, logging operations were concentrated on the eucalypts around the Derwent estuary but were gradually extended around the coast, particularly in search of Huon pine (*Dacrydium franklinii*), which was sought after because of its excellent properties for a great many uses and the dearth of conifers of such fine qualities on the mainland. The Huon pine stands in the reaches of Macquarie Harbour

on the west coast and the rivers flowing into it became the centre of logging operations in 1817. Large convict settlements were established on islands in the harbour for that purpose in 1822, and these operated for more than a decade.[3]

The wretched conditions under which convicts were sent from Sydney to Hobart and thence to Macquarie Harbour are described in numerous historical works, and the inhuman nature of the early logging operations on Huon pine were outlined in a felicitous phrase for the delegates to the 1928 Empire Forestry Conference in Tasmania: 'the timber was dragged and carried out of the bush by convicts, whilst warders assisted them along by the liberal use of whips'.[4]

The qualities and performance of the other timbers with which the island was wonderfully endowed, such as brown-top stringybark (*Eucalyptus obliqua*), gum-top stringybark (*E. delegatensis*), swamp gum (*E. regnans*), blue gum (*E. globulus*), blackwood (*Acacia melanoxylon*), and myrtle (*Nothofagus cunninghamii*), soon became known, and many fine buildings of early Hobart demonstrate their strength and versatility. Thirty years after the first settlement at Hobart, there was a sawmill nearby at the Cascades, worked by water-power.[5] By the early 1850s, sawmills were being established in the north, just in time to meet the demand created by the discovery of gold in Victoria. The great demand for sawn timber and split palings on the goldfields could not be met locally and gave great impetus to their export to the mainland from many parts of Tasmania and, following the forest clearing, to the establishment of agricultural settlement on the north-west coast.[6] Apart from the mainland, markets began to be developed in many countries for sawn and furniture timber, pavement blocks, sleepers, piles and ships timbers, a trade which was to form an important part of the island's economy. (The development of the timber industry, the export of wood, and their contribution to the economy of Tasmania, has been discussed in detail by Row;[7] the contribution of forestry and the forest industry to the development of Tasmania has been outlined and analysed in detail by Dargavel.)[8]

At this time, there was next to no supervision of timber-cutting — understandable in a country with a small population and an apparently unlimited forest resource. The first Waste Lands Act passed by the Tasmanian Parliament, after the control of crown lands passed to the colonies in 1856, was in 1858. This Act empowered the Governor to reserve 'Town Lands', 'Agricultural Lands' and 'Pastoral Lands'. There was no mention of forest conservation or timber-growing.[9] The only control was through the issue of licences by the Surveyor-General, acting as Commissioner for Crown Lands, to fell, remove and sell timber on unleased lands, subject to certain regulations. For example, an 1863 licence included: (i) 'no more than one Dog shall be kept by the party holding this licence and this Dog shall neither be of

the Mastiff, Bull Dog nor Kangaroo Dog breeds'; (ii) 'the party holding this licence is requested not to fire the bush'. Although the latter admonition seems rather gentle in view of the character of the timber-getter and the conditions of the time, there was in fact a Bush Fires Act (passed in 1854) with firmer clauses than many similar Acts of later times. For example, anyone lighting a fire from December to March on land of which he was not the owner was liable to six months' hard labour or a fine of £50, with a similar fine if it affected adjoining land; and this Act remained in force until 1932.

Forest Conservation Begins

The first concession to forest conservation was contained in an amending Waste Lands Act of 1865, by which local Boards of Works were empowered, subject to payment of appropriate compensation, to take timber from any uncultivated land 'except such trees as the owner could show, to the Board's satisfaction, had been reserved or would continue to be reserved either for ornament or for shelter'.[10] By the 1880s, pressure on the government by concerned citizens was sufficient for the genesis of reservation and a forest authority. The Waste Lands Act of 1881 empowered the Governor to establish reserves for the preservation and growth of timber and to exclude cutting from them.[11] In 1885 a State Forests Act was passed which empowered the Governor to appoint a 'fit and proper person' to be Conservator of Forests to have the management and control of all waste lands of the Crown 'which may be reserved to Her Majesty for the preservation and growth of timber or for public recreation'.[12] Unfortunately, the duties, power and responsibilities of the Conservator were not defined in the Act, nor was it supported by appropriate regulations.

G. S. Perrin was appointed Conservator and commenced duty in March 1886. He immediately set out to inspect the forests and sawmills and, by his first report to Parliament (included with that of the Surveyor-General a few months later), he had inspected a considerable part of the colony and accumulated a large number of sensible observations. He deplored the wasteful and illegal cutting and the wanton destruction that was rife and that could only be controlled by sound regulations and staff to police them. In 1887 he reported that the industry was in a

> very depressed state due in a certain measure to the protective policy of the adjoining Colonies, also to the action of sawmillers themselves who, by thrusting on the mainland markets timbers of very inferior quality, caused the buyers to turn to the newly opened-up jarrah forests of Western Australia.[13]

The sawmillers were also the victims of 'blackmailing' by selectors who took up blocks close to existing mills and cut off the sawmiller's

access unless an exorbitant charge was met. Perrin suggested that reservations or leases be made to sawmillers to reduce this problem of supply. In his second annual report, Perrin proposed useful silvicultural measures and plans for managing the forests, the abolition of licences and substitution of a royalty system, and the recruitment and training of staff; and he stressed the need for the Conservator to be given appropriate powers and supporting regulations. His suggestions, however, lacked the force of explicit recommendations and the government was not motivated to formulate a forestry policy. Perrin resigned and left Tasmania in 1888 to become Conservator of Forests in Victoria.

In 1889, W. H. T. Brown, an ex-member of Parliament, was appointed Conservator.[14] Steane refers rather disparagingly to his lack of qualifications and to his lack of intervention in the export of unseasoned timber to England, which was to handicap the Tasmanian timber industry for nearly half a century.[15] Gray, on the other hand, saw him as a 'realist'. As Brown reported:

> The forests of Tasmania are administered under the State Forests Act 1885 and the Waste Lands Act. The Conservator is appointed under the former and forty-two bailiffs under the latter. The bailiffs are generally policemen and receive no extra pay and in any case have little time for supervising licensees' operations, for patrol, etc. As a result much revenue is lost.

He saw an annual revenue of £2,500 as ridiculously small in view of the quantity of wood being obtained and recommended the appointment of rangers.[16] Brown resigned in 1892.[17] No move was made to appoint another Conservator and forestry matters were placed in the charge of the Lands Department.

In 1898, the Secretary for Lands, E. A. Counsel, submitted a lengthy report to his Minister on the *Timber Industry of Tasmania.* He recommended the provision of a royalty system, the proclamation of certain reserves, regulations for the protection of certain trees, stringent measures to discourage the lighting of fires on unoccupied crown lands and the immediate appointment of a forest officer. In considering these recommendations, the government invited Perrin, who by then had had ten years' experience in directing forestry in Victoria, to report on the situation. Perrin found the situation to be even worse than when he was Conservator and made firm recommendations for government action, indeed considerably firmer than any he had made as Conservator, which is understandable considering his more remote position. The government's response was to appoint J. Compton Penny in 1899 as Chief Forestry Officer in charge of a Forests Branch within the Department of Lands and Surveys.

Although Steane saw Counsel as 'complacent and contemptuous of outside opinion' and described his reports as 'dreary',[18] the latter at

least impress one as being unusually sympathetic to forestry, particularly for a chief executive of a Lands Department of those times in Australia. From the turn of the century, he was preaching a gospel of conservation and reservation in his annual reports, in striking contrast to the bare recitals of 'timber produced' and 'revenue collected' by his subordinate forestry officer, Compton Penny. Counsel's policy of 'placing the future timber industry on a sound basis' was certainly tempered by the qualification that the reservation of the 50,000 ha of the time had been made 'wherever this course has been practicable without blocking the way of selection by shutting up lands that the selector is prepared to take up and improve'.[19] But it was natural for a Lands Secretary of the day to give priority to settlement — that was his function. Nevertheless, to regard forest reservation as compatible with settlement placed him ahead of many of his contemporaries on the mainland. He recorded in his annual report for 1913 how gratifying it was 'to find the important subject of afforestation and reforestation being recognised and that a Bill is being prepared . . . to give effect to a definite policy . . . for effective control of this important industry'.[20] He continually emphasised the need for plantations of conifers to supply softwood and was most enthusiastic about the possibility of a Conservator of Forests being appointed at the end of World War I who would be able to advise on that work. Paradoxically, his Chief Forestry Officer appears not to have shared his enthusiasm. Compton Penny's response to the pressure of delegations waiting on the government to formulate an appropriate forest policy and to set up a Department to implement it, was that:

> the inauguration of a separate Forestry Department is a matter that can well be left in abeyance for the present. Until a course of action has been decided upon and a fair start has been made with plantations, the present staff is sufficient and quite capable of doing all that is required without involving the State in the large and for the time being unneccessary expenditure contingent upon the calling into existence of a separate Forestry Department.[21]

From the time of Perrin's first annual report (1886) of the difficulties sawmillers were having in getting access to supplies of wood, the industry continued to complain of lack of security. Counsel recorded in his annual report (1895) that the situation was chaotic. Sawmillers had no protection against 'timber poaching by other sawmillers or persons' and, in those circumstances, their reluctance to invest substantially in equipment was understandable, though the government had in fact permitted sawmillers to select land for 'settlement', as a means of providing them with some measure of security of supply, in contravention of the principles of its own Lands Acts.[22]

To redress the situation, the Crown Lands Act was amended in 1895 'to issue timber licences securing to the licensee the right to timber on a specified area . . . being 500 acres for 5 years',[23] an 'exclusive permit' which was the start of a system of licences, permits, concessions, etc. which was to become a feature of forestry in Tasmania. However, before long, the sawmillers saw this as inadequate. In his 1898 report, Perrin extended the proposals he had made when he was Conservator and suggested the leasing of blocks, of sizes appropriate to milling capacity and divided into eight sections, each with three years' cutting on them, to allow a twenty-four year cutting cycle. This proposal was considered impractical, but some relief was offered by the government in the same year by a further amendment to the Crown Lands Act. This increased the permit area to '5000 acres for 21 years at an annual rent of £1 per 100 acres plus a royalty of 1/- per 1000 super feet on eucalyptus with higher rates on pine and blackwood'.[24] But even this was not completely satisfactory. The annual reports of the Lands Department complained that the granting of large leases had not resulted in large-scale cutting as expected, and that too many were being taken up purely for speculative purposes. In 1904 the maximum area was reduced to 400 ha (1000 acres); and in 1911 it was increased again to 600 ha (1500 acres). As the reports were so often to imply, the leasing system was for many years 'unstable' and the supply situation 'erratic'.

In January 1908, a Board was formed 'to advise the Minister in matters of constructive forestry' with A. E. Counsel as Chairman, and L. Rodway (Government Botanist) and H. J. Colbourne (Agriculture Expert) as members.[25] Its main function seems to have been to supervise the early days of a forest nursery at the north-west end of the Hobart Botanical Gardens on land obtained from the Trustees of the Gardens.[26]

The Hutchins Report

In 1914, the British Association met in Australia. Among the visitors was D. E. (later Sir David) Hutchins, a graduate of the French forestry school at Nancy, who had retired after eminent service to forestry in many parts of the world. At first engaged by the Government of Western Australia to report on forestry in that state, Hutchins' consultancy was later extended to all the states of Australia and to New Zealand. In 1915 he presented his *Discussion of Australian Forestry*, an invaluable, though heavily subjective, comment on forestry at that time.[27] In editing it, C. E. Lane Poole (then Conservator of Forests, Western Australia) said:

> His candid and trenchant criticism and his evident appreciation of the factors influencing colonial progress entitle his conclusions to the fullest consideration. They are expressed in verbiage free from the conventional phrasing of strictly official reports.[28]

Hutchins' views on Tasmania were candid and trenchant indeed. He enthused over the forests of 'this gem of the South': with their development, 'in the future Tasmania can with confidence look forward to the development of the finest branch of Australian manhood'. But he saw the government as 'shiftless', the timber grants as 'reckless', its forestry as 'the worst in Australia' and its forest policy 'that of an uncivilised country'. He was also shocked by the destruction by fire. Counsel was equally shocked by Hutchins' intemperate report, though his official response carried only a mild retort:

> the want of knowledge of local conditions and our timber generally placed Mr. Hutchins at a disadvantage and led him to form some very erroneous conclusions which detracted largely from the force of his articles and nullified the enthusiasm which he imparted into the subject.[29]

Admonitions by Hutchins, that the

> Tasmania of today should write off its losses and think of Tennyson's well-known lines:—
>
> My father left a park to me, but it is wild and barren,
> A garden too, without a tree, and waster than a warren,
> Yet, say the neighbours when they call, this is not bad but good land,
> And has in it the germ of all that grows within the woodland.

were unlikely to be well received by a Lands Secretary not only acutely conscious of the problems but actively promoting them to a quite unresponsive government.

The Forestry Act of 1920

By 1919, the government could at least claim some response to the situation by its appointment in December of L. G. Irby as Conservator of Forests (Compton Penny's retirement being imminent) and by its instructions to him to draw up appropriate legislation. Irby had a background of forestry service in New South Wales under Hay and, before that, at the Technology Museum in Sydney under R. T. Baker. His proposals for the creation of a Forestry Department and for the various powers and duties of the Conservator were presented for discussion at the fifth Interstate Conference on Forestry at Hobart in April 1920 and elsewhere to sawmilling interests. They were eventually formulated in the Forestry Act of 1920 (which came into force on 1 January 1921, the regulations to support it coming into operation on 1 January 1922). The Act provided for the creation of a Forestry Department with certain functions, powers and responsibilities; for the financing of the Department; for the classification of forest lands, the dedication of state forests and proclamation of timber reserves;

for disposing of forest produce; for the fixing of royalties; and for granting leases for grazing. The financing of the Department was provided by the crediting of one half of each year's gross forest revenue, at the following 1 July, to a special fund which the Conservator could draw on with the Minister's approval. Any money not spent in the year credited could be carried to a later year.

The *Australian Forestry Journal* found much room in the Act for criticism.[30] A forestry fund with only half the gross revenue for both works and administration was thought too meagre — the payment of administration costs from the fund would leave little for forest development. The powers of the Conservator, being subject almost entirely to the Minister, were considered to be in jeopardy under an unsympathetic one. The preservation of existing rights under leases, permits and concessions would be a serious handicap to future management. Approval of working plans by the Governor would be found cumbersome, and allocating 'one and a half million acres of reserves in seven years', as the Act prescribed, would be difficult. As might be expected, however, the Conservator saw it as 'the most important step ever undertaken by the State with regard to its forests' and in his first annual report waxed enthusiastic over the future for forestry in Tasmania.

The 1920s saw a great interest on the part of the heads of the State forest services in the establishment of plantations of coniferous species to ensure a future supply of softwood for which there was an obvious demand in view of the large amount being imported from north-western Europe and north America. Trials in Tasmania had shown several exotic conifers to be promising, and there was a considerable amount of crown land in the state which seemed suitable for afforestation and which was not being, and was not likely to be, used for other purposes. The reports of the infant service carried an optimistic message of the development of a large program promoted particularly by the newly formed Tasmanian Forestry Association, one of whose objects was:

> to promote . . . the planting of the great waste areas of Tasmania with suitable exotic conifers . . . by the establishment of forest plantations, homes or colleges in which destitute and waif boys of the Empire may find their place, their manhood and their citizenship in planting the waste and in leaving a heritage of enormous value to those who came after.

The sixth Interstate Conference on Forestry at Brisbane in 1922 applauded the Tasmanian scheme as 'bringing into a forestry partnership of practical usefulness the waste lands of Tasmania and the waste childhood of the Empire'.[31] The scheme passed the State Development Board in 1925 and was offered practical support by Kingsley Fairbridge, who had founded farm schools in Western Australia, and by

the Dr Barnado's Homes organisation. However, the Commonwealth Government, whose cooperation was essential for making appropriate arrangements with the British Government and for providing finance, showed little interest and, despite continued enthusiasm for it in forestry circles for some years, the scheme was never implemented.[32]

At the seventh Interstate (Australasian) Conference on Forestry in Sydney (September 1924) Irby proposed the cooperation of the Commonwealth and State Governments in coniferous afforestation with Commonwealth finance. Arising out of this proposal, the Development and Migration Commission, which had instigated an economic survey of Tasmania, called for a survey and report on the forest resources of the state from the newly formed Commonwealth Forestry Bureau, and G. J. Rodger, then Chief Forester of the Federal Capital Territory, carried this out in 1927–28. His terms of reference were to examine and report on the economic position of the sawmilling industry, the possibility of establishing economical plantations of softwoods, measures necessary to assess the hardwood resources and the possibility of their regeneration, and the reorganisation of the forestry department to enable these things to be carried into effect. Rodger recommended a program of coniferous afforestation, detailed in respect of areas, species and likely costs and returns. He also stressed the need for topographical surveys and timber assessments of the indigenous forest.[33] The Federal Accounts Committee recommended an annual grant of '£3,000 for five years for surveys and assessment' but no grants for plantations; and, in the event, the grant was never made because of the economic depression.

The Foundations

Irby's appointment was terminated in April 1928. Penny had continued as Chief Forest Officer under Irby until he retired in 1923. T. J. Stubbs, who had been appointed Chief Inspector when the new Department was established, acted as Conservator after Irby left until S. W. Steane was appointed early in 1930.[34] Steane found:

> the accessible native hardwood forests . . . honeycombed with sawmilling permits to such an extent that very few mills had more than about twelve years life in sight . . . the regime of laissez-faire had become so firmly established that any mention of control or restriction was regarded as heresy of the most dangerous order. No attempt had been made, either with regard to forests as a whole or in respect of any forest area in particular, to provide for a sustained yield. No extensive survey had been attempted and the areas covered by topographical or forest maps were almost negligible.[35]

He outlined to the government a firm policy built around the 1920 Act. The government agreed it was essential and practical — but

approval was one thing, money another. In his first annual report, Steane drew attention to the effect which the economic depression was having on revenue and thus on the degree of forestry development. Although the 1920 Act was amended in 1930 to provide for the return to the Department of two-thirds of its gross revenue, this, under the circumstances of the depression, merely held the status quo. Any move by the Department to increase royalties to improve its financial position was met by strong opposition from industry. There was no loan money available and as Steane said, 'On the whole it is safe to conclude that our decennial celebrations are not likely to be marred by any unseemly exuberance'.[36] By 1932, the position was improving a little and was helped by a further amendment to the Act in 1942 which provided for the whole of the gross revenue to be credited to the forestry fund. However, dedication of forest reserves had been slow. Although the 1920 Act had prescribed that 600,000 ha should be dedicated within seven years, it had not prescribed a procedure for the dedication. It was not until 1932 that appropriate machinery for this was set up and it was 1937 before the target was reached; and much of what was dedicated was unproductive.[37]

In 1943, an affair arose which was to keep the Department 'continually under fire both in Parliament and in the Press' for the next three years.[38] The matter at first seemed of a low-key nature when the Conservator received a report in July 1943 which alleged some financial irregularities within the Department and which he referred to the Public Service Commissioner.[39] The matter was referred to the Auditor-General, who drew the attention of Parliament to it along with other matters in his report for that year.[40] The Legislative Council appointed a Select Committee to inquire into the allegations and the Standing Committee on Public Accounts was asked by the House of Assembly to look into them. Both committees recommended further investigations and the two Houses asked the Solicitor-General to conduct one in association with the police in July 1944. The report of this inquiry was presented to the Attorney-General in September 1945.[41]

Meanwhile, in August 1944, S. L. Kessell (then war-time Commonwealth Controller of Timber) was asked by the Tasmanian Government to carry out a comprehensive investigation into all phases of forest policy and management practice in the state and to deal specifically with a number of matters, including the capacity of certain staff for their duties; the adequacy of royalty rates and the method of assessing them for exclusive forest permits and licensed cutting; the size of exclusive forest permits issued to certain firms and the adequacy of the supervision of them; the methods of surveying, demarcating and granting exclusive forest permits; fire protection; silvicultural operations; the efficiency of administration; the state of the post-war forest plans; and control of pulpwood concessions.

Within a week of his appointment to the task, Kessell had submitted a preliminary report on the list of specific matters, full on some points, short on others because of the lack of time, and no doubt involving some circumspection since some of the matters were germane to the inquiries which had been and still were taking place. His main report dealing with policy and management operations in general was presented to the government in February 1945.[42] It was a searching report, generous of the work already done and sympathetic of the limitations resulting from the continual lack of funds, staff and government backing. It included a number of constructive suggestions for future policy and management, all eminently sensible and capable of implementation given the appropriate money, men and public support which the Conservator had sought unsuccessfully for years.

By November 1945, a Bill was being drawn up to amend the 1920 Act. By this time, too, the affair of the 'alleged irregularities' had developed considerably to include implications of wrong-doing on the part of past and present members of the government and the Select Committee appointed to consider the Bill thought it appropriate, in view of a likely Royal Commission, to defer their consideration of it. A Royal Commission under Judge R. C. Kirby of New South Wales was appointed in December 1945. The Commissioner reported his findings on two of the grounds of inquiry by the end of February 1946 and on the other five by the end of May 1946.[43] The Select Committee reconvened in June 1946 on the question of the proposed Forestry Bill and took evidence from a number of parties including the Institute of Foresters.[44] Among other things it recommended the setting up of a Forestry Commission composed of a Chief Commissioner and a Deputy Commissioner, who should have special knowledge and experience in all branches of forestry, more effective execution of responsibilities of staff under the Forestry Act of 1920, including the power of the Governor to exempt officers from the provisions of the Public Service Act, and the amendment of the Crown Lands Act of 1935 to prevent alienation of crown land without the consent of the Forestry Department.[45] The Forestry Act 1946 (an Act to amend the Forestry Act 1920) was brought forward in October 1946. It legislated for a Chief Commissioner with special knowledge and experience in all branches of forestry, an Assistant Commissioner with scientific attainments and a technical knowledge of forestry and an Assistant Commissioner with practical business experience and executive ability. The Commissioners were to hold office for five years. The staff of the Department were to be retained under the provisions of the Public Service Act, but the Commissioner, with approval of the Public Service Commissioner and the Governor-in-Council, could exempt certain officers from it. The Commission took office in April 1947, composed of A. H. Crane as Chief Commissioner (previously Senior Forester in the Queensland

Forests Department) with H. Payne and B. Plummer as Assistant Commissioners.

Conservators in Australia in the 1930s and 1940s had an arduous time with the economic depression, the war years and their aftermath, and the slow progression of public attitude from antagonism through apathy to constructive interest. During his term Steane undoubtedly had an even more difficult time than most. Industry had a fairly strong hold on the forest and on political sympathy when he took over. Funds, staff and equipment were generally insufficient during the depression years, the war years and the rehabilitation period which followed, and in the years of the inquiries when Parliament was unwilling to sanction funds to a Department under suspicion. It is easy to lose sight of the solid achievements of the Department during the period of Steane's headship in the clouds of its closing events. The continual destruction of the forest by fire, which had shocked Hutchins nearly twenty years earlier, was always high in the priority of the Conservator's concern, but lack of funds in the 1930s prevented the purchase of badly needed equipment and work on tracks and fire-lines. It took the worst fire season for nearly forty years in 1934 to arouse the government to the need for a better protection organisation and, though the promise of funds was not in the event fulfilled, a good Bush Fires Act to replace its eighty-year-old predecessor was passed in 1935 so that, when the Commission took over, at least the nucleus of a good fire prevention and suppression organisation existed. Firmer organisation of forest operations was gradually being established through a system of formal management plans, and utilisation of the forest was coming under much better silvicultural control. Steane stayed on to assist the Commission in many ways, especially in extension work, to which his long experience well fitted him, until his retirement in 1953.

The First Commission

The Commissioners saw their main task as directing management to sustained yields of wood along with the protection of watersheds and the general conservation of the native estate, especially its protection from fire. Within about twelve months, they had carried out an appraisal of the timber supply and the timber industry. It was a natural prompting for a new Commission wishing to clarify its goals; it was also prompted by a surge of interest throughout British Commonwealth countries in a stocktake of resources, planning for post-war development and a determination to be better prepared to meet any future international emergency. It saw as the outstanding needs:

> an inventory of the forests . . . and the accumulation of facts on growth rate; the definition of and dedication of first-class forest lands; the

> provision of roads in forests for better utilisation and access for fire protection; progressive improvement in fire detection, access and suppression; the acquisition of available land to consolidate working units and provide suitable topographic protection boundaries; the creation of pine plantations to be managed intensively for high grade timber production as well as low grade material.[46]

Although Owen Jones, as Chairman of the new Forests Commission in Victoria, had propagated the idea of forest surveying, mapping and assessment from aerial photographs in 1920, Tasmania claimed the first aerial forest survey in Australia in April 1930 when an area of 900 km^2 was photographed in the north-western region by the Federal Air Board.[47] Further aerial photographic projects were inhibited by lack of funds caused by the economic depression, and by the time funds and aircraft were available in the late 1930s, the demands of World War II intervened. Towards the end of the war, a Forest Demarcation Branch was established to assess the general usefulness of the forested areas of the state and to make recommendations for demarcation of further state forest. It began to use for this work aerial photographs which had been taken for defence purposes. At the war's end, when a considerable amount of equipment and expertise in mapping and interpretation of aerial photographs became available for civilian work of this kind, a Photo-Interpretation Section was formed and began to make spectacular progress in the interpretation of forest types and the preparation of type maps from it. From this developed forest-quality classification which required relatively little field-work to support it, an enormous advantage in the vast areas of the state with limited and difficult access, and before long the new Commission was well on its way to meeting by this means several of the 'outstanding needs' it has listed in its 1948 summary of its future.

At this time the Commission was under considerable pressure regarding wood supply for the state. By 1948, there was an intense demand for all classes of forest products, building timber in particular, from Tasmania and the south and south-eastern parts of mainland Australia, because of the lag in building caused by the war, the flow of migrants from Britain and Europe, and increasingly rapid industrial expansion. There was also a demand from Britain, with its enormous task of post-war reconstruction. The slow re-establishment of importing systems, the shortage of dollars for Empire countries for trading with North America, and several other factors all combined to favour export of wood from Tasmania over local sale and by 1950 the Commission was making veiled threats to the timber industry regarding its control over the sale of the raw material to industry unless action was taken by industry to stop prejudicing local needs. The whole situation called for a comprehensive estimate of the state's forest resource as soon as possible, and to obtain this several branches of the Commission were working as fast as they could.

By mid-1951, through aerial-photo mapping and interpretation, supported by field measurement and estimation of wood volume on a small sample, an estimate was available of the area and the mill-log volume of the accessible mature and overmature stands (excluding the concession and pulpwood areas). Of this area only about 15 per cent was readily accessible to logging roads, about 15 per cent shortly to be accessible, 40 per cent more or less within reach of major access roads but still requiring a great amount of road works to get at the wood, and about 30 per cent quite remote from any major access. There was also evidence of an extensive area of young regrowth eucalypt stands, resulting from logging and fires of the past, which would not be suitable for sawlogs for many years though they would contribute an increasing volume of wood in the meantime. Much of the resource was on vacant crown land outside the control of the Commission and its responsibility and capacity for fire protection. The Commission's conclusion was that the present timber industry could be maintained at its present level, though not in all cases in its present location and only if a considerable program of roading of the mature forest was undertaken, and if both mature and regrowth forests were adequately protected from fire so that the latter grew to replace the former. In face of the increasing demand for wood within the state, the Commission reiterated its policy of declining new sales of raw material except to meet local needs until an appropriate balance was struck between those needs and export. The Commission could not control the export of timber while this was more favourable to industry, but it could and would manipulate the supply of raw material from the crown resource to try to see that the state's needs, for which it was responsible by its charter, were met.

By the end of 1951 the complaints about lack of timber for local building needs had reached such a level that the government appointed a Board of Inquiry (the Chief Commissioner being one of its three members) to inquire into the total building timber produced in the previous five years, from both crown and private land; whether the amount available for local use was sufficient for the reasonable needs of the state; what the future needs of the state for the next five years might be, the likelihood of them being met, or how those requirements might otherwise be assured. The board reported great difficulty in obtaining appropriate information because of a marked reluctance on the part of members of the timber trade to give it. In its report,[48] it endorsed the Commission's policy of making new sales from crown land conditional, priority being given to local needs of sawn timber; it recommended legislation to give the Commission absolute discretion with respect to the renewal of forest permits; and it recommended continued maintenance of war-time price control, with some qualifications, and that consideration be given to increasing royalties if and when price control was lifted. In somewhat

Draconian fashion, but obviously reflecting the lingering atmosphere of war-time controls and the frustration of the Commission in its attempts to ensure the state's needs were met ahead of those of the mainland or overseas, the board also recommended legislation be enacted constituting an Authority with power to acquire timber from anyone holding it and to assign it to anyone in the state who needed it and could not get it, and with power to require statistics of production, intake and sales from anyone involved in the timber trade. The board finished its report in April 1952 but, between then and the following August when the report was presented to Parliament, there was an abrupt contraction in the demand for sawn timber and the government felt it unnecessary to give effect to any of the board's recommendations.[49]

The committed identification by the Commission with a role of watch-dog over the supply of wood products to the people of the state, and a role in the general economic well-being of the state, was further illustrated in 1956–57. A decline in the export trade to the mainland because of a decline in home-building there, combined with a surge of low-priced imports from Asian countries with lower cost structures, had resulted in the reduced output and closure of a large number of Tasmanian sawmills. The Commission identified itself with a stable market for processed material, as well as a stable supply of the raw material, in the economic interests of the people of the 'smaller towns and sparsely settled districts in which sawmills are situated' and where 'the timber industry plays a significant part in [the] local economy . . . The State as a whole feels the effect of a depression in the timber trade. If that trade is threatened, the Commission cannot hold aloof'.[50] It therefore readily joined with industry (and with the industry of the mainland states, similarly suffering the effects of the imports) in seeking protection through the Tariff Board by its restriction of the imports or the application of a tariff on them.

The State Government supported these representations along with a request to the Commonwealth Government for financial stimulus to home-building. In the event, the Tariff Board declined the application. It preferred to see the situation redressed through amelioration of the present freight disadvantage under which Tasmanian exports laboured relative to imports from other countries. With imports rising substantially at the time, the Chief Commissioner expressed concern at the unprotected nature of the timber trade with the mainland, which was an essential feature of the state's economy, and at its vulnerability should import licensing be withdrawn, which did occur in mid-1960. The Chief Commissioner was also not slow to seize an opportunity to point a moral which reflected a problem in the trade at least a century old — that was the need for the industry to pay attention to quality and grading. As he said, the competing imports were in no way inferior in quality and use to the best Tasmanian

hardwoods; their market presentation was better and the profit margins on them were bigger. Whereas there was a case for increased tariffs to establish competitive prices, there was an equal case for matching competition in other respects. In 1958, at the Commissioner's instigation, the Minister constituted a Timber Utilisation Committee to look into the better use of the forest and the product.

From the time of its appointment, the Commission began to express concern at what appeared to be, from the limited information it had about the forest resource, the overcutting of sawlogs from the crown estate. For years, in its annual reports to Parliament, it expressed the intention to move towards sustained yield as soon as possible and warned industry that this move must lead to a reduction in supply. But the implementation of this intention was continually frustrated by the continually increasing demand for sawn wood by its own and other states catching up from the war years and enjoying the later economic boom. Within five years of the Commission's appointment, the sawlog cut from the crown native forest had increased by 50 per cent; within ten years, it had almost doubled. By the mid-1960s, now armed with much more confident estimates of the extent, condition and rate of growth of the crown resource, the Commission was sounding strident warnings that the state was beyond the maximum permissible cut as it saw consumption rise to two and a half times the immediate post-war total.

It was not until the late 1970s that the Commission's view seemed to have a reasonable chance of at last taking public hold. In late 1978, the Commission produced a paper, 'The sawmilling industry and the Wesley Vale Concession Area', outlining a plan, aimed at industry and seeking its cooperation, to reduce the sawlog cut to something like a third of the present total in several steps over the next eight years. In mid-1979, crown allocations for the north-west coast were similarly reviewed and reductions notified; and the Commission anticipated reviews and reductions in the remainder of the state the following year.[51] It was a more determined move than ever before to implement the main element of its charter; that is, 'to systematically manage the Crown forest estate and its renewable resources in perpetuity, with the aim of ensuring stability in the wood-based industries'.[52] It remained to be seen whether this move would in the event be any more effective.

Pulpwood, Paper and Woodchips

The Beginnings

When the new Commission assumed office in 1947, a pulp and paper industry was already well established. This was to be expected, for Tasmania had led the states in the production of pulp and paper from its native estate. Compton Penny, as Chief Forestry Officer at the turn of the century, recorded numerous enquiries about the suitabi-

lity of Tasmanian species for the purpose, and by August 1914 the government had become sufficiently interested to invite H. E. Surface, a consulting engineer in forest products, of Madison, USA to investigate the possibilities of paper making from Tasmanian timbers. His recommendations, in summary, were that:

> as purely a business enterprise, the utilisation of (myrtlebeech, swamp gum, blue gum and stringybark) or other hardwoods of a similar character for the manufacture of paper pulp should not be given further consideration unless there should be very radical changes take place in forest logging, manufacturing, market, tariff and other relative conditions,

the main difficulty being that the 'hardness, natural colour and comparatively short fibre [of the woods] confine their possible use to "soda pulp" '.[53] He concluded that these woods were not suitable for pulp manufacture using mechanical grinding or the chemical sulphite process but would produce excellent pulp by the soda process. However, he believed that the yield would be comparatively small and so could not recommend commercial production.

By 1922, much more encouraging results were emerging from the experimental work of the Forest Products Laboratory of the Institute of Science and Industry, led by L. R. Benjamin. This prompted the Tasmanian Government to fund an investigation by the Laboratory of the suitability of samples of *E. regnans*, *E. obliqua*, *E. globulus*, *E. delegatensis* and *Nothofagus cunninghamii* for pulping. The tests were highly satisfactory and the whole question of a pulp and paper industry in the state was opened up. Irby, for example, in his 1923 annual report to Parliament, took the lead from Benjamin's findings and argued the case for such an industry. He believed that there were large areas of regrowth, the wood of which could be readily pulped by the suitable modification of well-known pulping processes with low production costs. Provided the pulp was beaten under the correct conditions, a wide range of papers could be produced, and the production of newsprint looked economically possible. In addition, there were abundant areas where radiata pine could be grown to provide the long-fibred pulp which traditionally had to be added to the short-fibred pulp of broadleaved species like eucalypts to make paper. There was an abundant supply of water and energy from hydroelectric power, both of which were needed for such an industry, close to the source of the raw material.

To a government anxious to promote the industrial resources of the state so as to retain and expand its population and its economy, a pulp and paper industry naturally provided an attractive opportunity. For all its apparently profitable nature, the pulp and paper industry walks a fairly delicate economic tightrope. One of the most important

elements of the industry is the guarantee of suitable, cheap raw material over a long term. It tends to seek large forest 'concessions' to ensure continuous and continued supply. The pros and cons of the granting of concessions of raw material by government to induce the interest of industry in such cases have been debated in many parts of the world for a very long time. It is unlikely that the Tasmanian Government of the 1920s thought such a debate very necessary, for the concept of 'concessions' of forest produce had been established during the previous century, in the form of various kinds of permits and licences, without much public opposition. It was therefore natural that the government would see the solution to the problem of a long-term supply of raw material to a pulp and paper industry in similar terms. In any such arrangement, of course, both government and industry would be seeking to maximise the benefit to itself. In the several concessions which eventuated, the relative benefits seem to have varied according to the circumstances of the times and subsequent events.

The First Concession: Associated Pulp and Paper Mills

The first concession was granted to Amalgamated Zinc Ltd under the Wood-pulp and Paper Industry Encouragement Act 1924, which authorised to the company supplies of wood-pulp timber from an area of crown land in the vicinity of the railway from Burnie to Zeehan, subject to certain arrangements with and controls by the Conservator of Forests.[54] This Act was repealed by the Wood Pulp and Paper Industry Encouragement Act 1926 whereby the concession was granted to Gerald Mussen,[55] who for the purpose formed Papermakers Ltd. This company amalgamated with Tasmanian Paper Pty Ltd in 1936 to become Associated Pulp and Paper Mills Ltd (APPM), which commenced operations at Burnie in 1937–38. Although the Act gave it exclusive rights to hardwood pulpwood at the rate of about 150,000 tonnes per year from a concession which included a crown area of about 250,000 ha, the company began drawing most of its wood from private property and continues to do so, drawing about three-quarters of its supply at present from private land, mostly its own. It is also involved in eucalypt sawmilling.

The size of the operation and its likely future demands worried the Conservator of the time.[56] The pulp and fuelwood requirements of the new industry were 'equivalent to rather more than half the present total timber cut on all the Crown lands of this State'. While the company obtained the bulk of its requirements from private land, particularly its own, well and good; but if the Department was called on to meet its requirements, he saw problems in integrating these with the present and future requirements of the sawmilling industry, to which he obviously considered the Department owed first allegiance. It was a concern which was to lead the later Commission to different 'rules' in the granting of concessions.

Australian Newsprint Mills

In 1922, 'the possibilities of the Florentine Valley as a forestry proposition and also from an agricultural point of view were closely investigated' and the Conservator's annual report for that year included the assessor's detailed report. It indicated extensive stands of commercial wood. In July 1932, the Florentine Valley Wood-Pulp and Paper Industry Act was passed granting to Thorold Fink (subsequently the Derwent Valley Paper Company Pty Ltd) timber-cutting rights over about 80,000 ha of the crown forests of the Florentine, Styx and Russell Falls Valleys, and the Ellendale–Bethane Forests.[57] In 1938 this became Australian Newsprint Mills Ltd (ANM), which commenced production at Boyer on the Derwent River in 1941.[58] The concession was redefined in 1949 after a Joint Committee inquiry.[59] An amending Act in 1966 authorised extension of the concession to a gross crown area of about 160,000 ha. In the terms of the Act, the company is responsible for forest management (roading, harvesting, regeneration, protection, etc.) subject to the approval of its plans by the Commission.

The Southern Forest and Australian Paper Manufacturers

The interest in pulp and paper in Tasmania by the mid-1920s was widespread and, along with the proposal to establish an industry near Burnie (legislated for in the Encouragement Act of 1926), the Conservator reported that 'the southern forests were being favourably viewed in connection with a similar proposition'. The Department had encouraged this interest. It had prepared a pamphlet on the paper pulp resources of the state for distribution 'to firms and individuals interested in the establishment of the industry in Tasmania' both within the state and at the British Empire Exhibition held in London in 1924, to which it had contributed a comprehensive exhibit of Tasmanian timbers. To make the point, the pamphlet was printed on paper manufactured from Tasmanian species. The Department had also made a further financial contribution to the pulp and paper investigations being made by the Institute of Science and Industry.

Firm interest in the south began with the grant of a concession to David Avery (subsequently Tasmanian Paper Pty Ltd, a subsidiary of Amalgamated Zinc Ltd) by the Kermandie Wood Pulp and Paper Industry Act 1926.[60] An experimental mill was established at Kermandie in 1927 and Benjamin, who had pioneered so much of the paper-making research in the Institute of Science and Industry, moved there to head investigations. In 1930, the company collapsed as a result of the economic depression,[61] preventing the intended establishment of a full newsprint mill, and the pilot plant was shut down.

The southern region was therefore an obvious one for the new Commission to turn to in its investigation of the state's resources and the possible extension of industry and, very shortly after its appointment, the Commission began an intensive study of an area of about 60,000 ha, south and east of the Weld and Huon Rivers, composed of roughly equal proportions of old-growth forest on mountainous and plateau country inland, and of regrowth forest along the coast resulting from fires which followed early logging and to some extent affected by later fires. The stands were mostly of *Eucalyptus obliqua* with *E. regnans*, and lesser amounts of *E. globulus* and *E. gigantea*. It had been logged since the early days of settlement, industry gradually declining as access became more difficult. The Commission began building roads into the old-growth stands for sawlogs in 1948 and shortly afterwards into the regrowth stands for case milling to supply the apple industry of the Huon, which had experienced a boost in the early 1950s.

Whereas little had been done in the case of the concessions of the 1920s and 1930s to integrate the supply of raw material to the new pulp industries with the supply of sawlogs to the long-established sawmilling industries, the conditions of the 1950s demanded it. This meant comprehensive information about the growth and yield of the resource was needed so that confident estimates could be made of the present and future yield of various products of the forest and confident allocation of them could be made to their most appropriate use. After about six years of work, much of it of a pioneering nature, on the assessment of present volumes from aerial photos and ground sampling, and on the development of growth and yield models for the regrowth stands, the Commission submitted a report to the government in 1953 outlining the potential of the area and recommending the establishment of a wood-pulp industry based on integrated logging for both pulp and sawlogs. The government responded in 1954 with an amendment to the Forestry Act of 1920[62] authorising the Commission to contract for the sale of pulpwood under certain conditions for a certain period.

One of the applications was for the production of pulp as a base for the manufacture of rayon, and the Chief Commissioner travelled overseas to discuss with the applicants what the government hoped might become a new and extensive industry for the state. It was eventually decided that the overseas markets on which the venture depended were doubtful in view of the levels of Australian costs of production and the project was shelved.

In 1956 the Commission granted Australian Newsprint Mills an option to investigate the prospects of expanding its manufacture of newsprint into the area. This was subsequently extended to early 1958, by which time ANM decided not to excercise its option because it saw itself unable to ensure long-term orders for newsprint in

Australia owing to the ready supply from North America. In mid-1958, an option was granted to L. R. Benjamin in association with Australian Paper Manufacturers Pty Ltd (APM), and in 1959 the Huon Valley Pulp and Paper Industry Act gave that company rights to pulpwood from a gross crown area of about 250,000 ha (including a 'reserve area') with an ultimate allowable cut of the order 240,000 tonnes per year. The Act featured provisions for integrated logging to ensure sawlogs for the milling industry, and provisions for the management of the forest, for sustained yield of sawlogs and pulpwood, to be the responsibility of the Commission on the basis of a working plan which was gazetted along with the enactment. In 1962 the company commenced production of pulp pellets at Port Huon, close to the site of the old Kermandie pilot plant, for export to its papermills on the mainland.

Wesley Vale and Associated Pulp and Paper Mills

In 1946, the Tasmanian Paper and Timber Mills Act was passed giving the Tasmanian Paper and Timber Mills Ltd rights to timber on certain crown lands east and west of the Tamar River in northern Tasmania. The Act contained an interesting clause (Section 8(7)) to the effect that certain working-plan prescriptions had to be approved by the Conservator and executed by the company. If the Conservator and company failed to agree on an amendment to an annual program of operations, this clause required submission of the amendment to the final adjudication of a person nominated by the Institute of Foresters of Australia.[63] In 1955, the company was forced to cease operations because of heavy losses and the government accepted the recommendation of the Chief Commissioner of Forests that surrender of rights to the concession area be accepted.[64]

In 1961, with the Wesley Vale Pulp and Paper Industry Act, APPM was given rights to about 500,000 tonnes of pulpwood annually from crown areas representing a pulpwood area to the west of the Tamar, and a reserve area to the east of it, totalling about 500,000 ha. The company established a paper mill at Wesley Vale near Devonport and plans to establish a pulpmill there to use pulpwood from the concession area; meanwhile, approval has been given for the company to export woodchips from the area. In keeping with the provisions established in the case of the southern forests, the Commission is responsible for the management of the area through the medium of a working plan which is based on integrated logging and the sustained production of sawlogs and pulpwood. In this case, roading is a joint responsibility of the company and the Commission.

Hardwood Woodchips

The extent and nature of its forest resource, and the established pulp and paper industry, put Tasmania high on the Japanese shopping list

for woodchips in the mid-1960s, and both interested entrepreneurs and the Commission were looking intently into the feasibility of a hardwood woodchip export industry for the state. This included sawmilling organisations who were anxious to ensure that negotiations for pulpwood involved integrated logging to protect their own interest in the maximum, sustained yield of sawlogs. By mid-1968, the Commission reported to Parliament that, though no agreements had been concluded, studies had shown adequate resources existed in the north and east for such an industry and the Commission was optimistic that one would develop. It saw this not only as a means of using forests and trees that were 'stagnating' and transforming them into 'continuously productive stands not only of pulpwood but also of sawlogs' but also, in the long run, as a means of expanding the present pulp and paper industry. Of course, the forests would have to be regenerated; and the price for the chips would have to be adequate for access and protection during the harvesting and for the skilled management that would be needed to create and maintain the new forests.

During 1966–68 there were a number of groups planning woodchip projects and trying to negotiate contracts for them with or through the main parties involved — the Japanese buyers, the State Government, which had its terms, and the Commonwealth Government, which was imposing certain conditions in the granting of an export licence. There was also a certain amount of sorting out and reconstituting of these groups in the process of the various negotiations. The chronology and details of many of the early events have been admirably recorded by the Environmental Law Reform Group.[65] In the event three firms emerged.

A group titled Tasmanian Pulp and Forest Holdings Ltd (TPFH) successfully negotiated contracts with Japanese buyers and an export licence from the Commonwealth Government during 1968. The Pulpwood Products Industry (Eastern and Central Tasmania) Act, December 1968 gave the company pulpwood supply rights from a crown concession of about 300,000 ha (containing about 200,000 ha of commercial forest) along the east coast of the state, from which it could cut about 500,000 tonnes of pulpwood per year for eighteen years. If, by the end of that time, either the company or the government had demonstrated that it was feasible to establish a pulpmill in Tasmania based on supply from the pulpwood area, then the company would have to establish a pulpmill or lose its pulpwood supply rights. If the pulpmill was established (either then or in the future), then the company could continue to draw pulp from the pulpwood area plus a reserve area of about 250,000 ha of which about 120,000 ha were of commercial forest, to the west of the pulpwood area in the central highlands, either at the original rate or a rate to be determined, for eighty years. If it was shown that it was not

feasible to establish a pulpmill, the company could continue to draw from the pulpwood area at a rate to be determined. With a total annual contract for 600,000 tonnes, the other 100,000 tonnes was planned to come from private property, sawmill waste, and from removals by the Commission during road-making and silvicultural operations. As in the case of the Wesley Vale and Southern Forest projects, the Act included a working plan whereby the Commission was responsible for general management except new logging roads, which were the responsibility of the company. The company began exporting chips from its woodchip mill site at Triabunna on the east coast in April 1971.

In 1979–80, APPM bid for the whole of the share holding of TPFH and subsequently acquired it.

Pending the establishment of a proposed pulpmill at Wesley Vale, APPM was given approval to export chips from its pulpwood concession under the Wesley Vale Pulp and Paper Industry Act of 1961. This source of supply was enhanced by the approval of the Commission for the company to cut annually, for an initial export period of five and a half years, upwards of about 250,000 tonnes of pulpwood from crown forests in the north-west not already included in any concession. The company began exporting chips from its woodchip mill at Long Reach on the Tamar River in 1972–73.

Amongst the earliest of those interested in the woodchip industry in Tasmania were elements of what became Northern Woodchips Pty Ltd and is now Forest Resources. Its composition has undergone several changes since it was originally formed in mid-1970. It obtained approval towards the end of 1970 for the export of about 700,000 tonnes of chips per year for fifteen years from a woodchip plant at Long Reach on the Tamar River, all of its pulpwood supplies coming from private land and sawmill waste. Under its contract, it was required to begin about 2000 ha of reforestation in its sixth year of operations.

The Impact of the Expanding Pulpwood Industry

Until the enhanced interest in the supply of woodchips which the Japanese market brought in the mid-1960s, the establishment and expansion of the woodpulp industry in Tasmania took place at a comparatively slow pace. Although the three projects in the Florentine, Burnie and Huon regions were all proposed about the same time in the early and mid-1920s in sympathy with the promise shown by the research into pulping and papermaking, the Acts to 'encourage' the establishment of industry in those places, and the actual establishment of the industry, had a comparatively long gestation. And, with the south and north-west variously under review or under operations, it was natural the Department should look for or respond to an interest in the north-east, which eventuated in the concession

west and east of the Tamar to the Tasmanian Paper and Timber Mills Ltd through the 1946 Act.

The new Commission's early estimate of the native resource there convinced it that accessible good quality sawlogs were becoming scarce, that industry was cutting beyond a rate that could be sustained under the present management, that continued selective sawmill logging would only degrade the forest further, and that the integration of pulpwood logging with sawlog harvesting was the only way to carry out effective reforestation and ensure a stable future industry. This was the background to its moves to bring integrated logging to the southern forests and to ensure that the transfer of the concessions bordering the Tamar River in 1961 incorporated this provision. It was the background to the enthusiasm with which the Commission looked forward to the woodchip export industry and the beginning of an opportunity for management, as the Commission saw it, of the eastern forests in the concession to TPFH. Had the great expansion of the Japanese pulp and paper industry in the 1960s not sent it to Australia looking for wood to enhance its supplies from many other parts of the world, it is possible that Tasmania would have seen its local pulp and paper industry expanding at something akin to the rate it had followed previously. The change which the hardwood woodchip export industry brought was explosive by comparison. Between 1969–70 and 1974–75, the annual sawlog cut from crown land remained roughly the same and the pulpwood cut by the pulp and paper industries increased only from about 450,000 to about 600,000 tonnes, but the pulpwood cut by the woodchip export industries increased from nil to more than 1,000,000 tonnes. During the same period, the sawlog cut from private property decreased and the pulpwood cut increased from about 300,000 to 1,400,000 tonnes.[66] Understandably, the woodchip industry in Tasmania became controversial.

The Commission's reaction to the changed circumstances is reflected by Quick.[67] He saw this period as providing the Commission with a good opportunity to shape future management strategies, with industry developing a 'proper understanding of the new resources available to it and constraints on their use', with 'the conservation movement [coming] to understand the use of forests for the production of wood' and the forest manager using the period 'to develop a balance of policies for the future'. He saw it as inevitable that the use of the forest would have to be modified to take account of new demands either by changes in land use within state forests on the part of the Commission or by the transfer of state forests to the control of some other land-use authority. He saw three broad types of management: wood production as the major or sole objective; wood production as one of multiple objectives; and wood production excluded. Industry, with long-term rights to wood, would have to be prepared to meet

reasonable modification of those rights. The Commission would have to be prepared to meet reasonable modification of its policy of wood production as the primary objective, otherwise it would lose its authority. Both industry and the Commission would have to work at meeting industrial demand from a smaller resource; for example, through an improved data base which allowed quick and effective review of management options; by improved technology of wood harvesting and use, particularly as quality would inevitably decline for some time; by making integrated logging really work; by the allocation of wood on a volume basis rather than by permit area; and by recognising that, for sustained yield, the cut must be reduced. Planning the operations required new skills in adapting conventional harvesting to the new demands for care of the environment; the scale of the operations demanded a new approach in their implementation and control over their effects. All this opened up considerable avenues of research.

The reaction of various members of the public to the changed circumstances was rather different. Although there had been some objections at various times to policies and operations in the three pre-woodchip pulpwood concessions, they were minor rumblings compared to the storm of protest which began to develop when the scale and effects of the woodchip pulpwood concessions were brought to public view. The Commission saw the new pulpwood industry as a welcome opportunity 'to renew the resource by complete harvesting and regeneration'.[68] The opposition saw it as the development of an extensive and expensive infrastructure to promote forest devastation on a massive scale in this country and industrial aggrandisement in another. Coming on top of what was purported to be happening at Eden, it exacerbated the outrage against woodchips. A vast amount has been written and said about the woodchip industry, or certain aspects of it, in Tasmania. It is far beyond the scope of this chapter to even summarise those comments and objections. The reader is referred, for example, to the reports of the inquiry into Woodchips and the Environment by the Senate Standing Committee and the massive evidence presented to it,[69] *The Vanishing Forests* by the Environmental Law Reform Group of the University of Tasmania,[70] and *The Fight for the Forests* by R. and V. Routley.[71]

Regeneration

Since a major part of the rationale for the pulpwood operations in Tasmania is the replacement of 'stagnating', 'degraded', 'overmature', etc. forests by new, vigorous ones which will maintain a vigorous, stable wood-processing industry, the questions of whether the large areas of public forest allocated to pulpwood operations and the considerable areas of private land from which the pulpwood industry also draws supplies can and will be regenerated satisfactorily are

critical ones and naturally have been at the centre of the storm of criticism over woodchips.

The regeneration of the public forest had been a matter of responsible interest to the forest service from its foundation but, in the early days, the service was largely content with the fact that in most cases the native forest did regenerate reasonably successfully after logging without human intervention (though the fact that the most successful regeneration was frequently associated with a hot wildfire did not pass unnoticed) so that the early annual reports of the Department bore laconic comments such as 'natural regeneration has been relied on for the restocking of cut-over areas'. The first annual report of the new Commission carried this a step further with 'in general satisfactory to excellent results are reported' but qualified this with a precautionary 'regeneration results, however, vary sufficiently to indicate the need for close study of the problem to ascertain the important controlling factors and indeed to establish the best technique for treating hardwood forests'. It was, in fact, an admission that little was known about the subject, particularly in the case of the better quality forests.

In the early 1950s, a small start was made with this 'close study', but the major boost which a problem of its proportions needed came in 1954–55 when research fellowships were awarded by ANM to J. M. Gilbert for full-time study of eucalypt regeneration in its concession in the Derwent and Florentine Valleys in association with the University of Tasmania, and by APM to T. M. Cunningham for a similar project in Victoria in association with the University of Melbourne. The timing of their research was fortunate. In 1958–59, a Select Committee of the Legislative Council had been appointed to inquire into, inter alia, 'the progress made by the Forestry Commission in the regeneration of Tasmania's indigenous eucalypt forests'. The committee reported[72] that the Commission had not established any sizeable regrowth stands by its own effort, that adequate regrowth had been established without assistance in the open forest types of the north-east, but that in the north-west and south, where heavy rain forest understorey precluded natural regeneration of eucalypts, regeneration had not been satisfactory. While agreeing that this was an unsatisfactory state of affairs, the Commission thought that its limited resources were better engaged in the more practical and urgent problem or preserving the existing stands from fire. The committee recommended that 'a vigorous policy of regeneration based on the results of the Commission's research be implemented without delay, with particular regard to forests with a heavy scrub understorey'.

It was to these wetter forests with the heavy understorey that much of Gilbert's and Cunningham's work had been directed and, with the publication of their research in 1958, the Commission had

these officers begin the organisation and direction of large-scale investigations into the practical implementation of their findings. What was needed could be simply stated: it was an economical means of getting, at the one time, an effective seedbed and an effective supply of seed to it. Providing those means was, however, far from simple. The basic problem in getting an effective seedbed was the need to bare the soil after harvesting for sawlogs. Fire was an obvious tool, but the understorey had to be readied for it; burning had to be hot for best effect but had to be done safely; large areas had to be treated, but there were few suitable days; above all, burning after only sawlogs were harvested meant the destruction of a great amount of what might shortly be marketable as pulpwood. The basic problem in having an adequate supply of seed available once the seedbed was prepared by fire was that the seed was not stored in the ground, any seed on the surface was destroyed by the fire, and otherwise was only available from limited remnant trees. By continuous research effort during the next decade, the Commission worked out how to plan and carry out the necessary hot debris burns safely and effectively, how to ensure full regeneration by aerial sowing of seed, and how to regulate browsing of the regeneration by native animals. With the increased demand for pulpwood in the early 1970s, the major inhibition against regeneration treatment of the partially utilised forest that had prevailed in the 1960s was removed.

In contrast to the Select Committee of 1958–59, another Select Committee of the Legislative Council, appointed in July 1970 to inquire into (inter alia):

(1) The progress made by the Forestry Commission in the regeneration of Tasmania's eucalypt forests since 1959
(2) The policies and controls necessary to ensure a continuity of forest regeneration and re-afforestation on (a) Crown land; and (b) private property

felt itself able to report (December 1972) that 'a well-planned program of continuous regeneration and restocking of newly harvested areas in addition to the old forest, has been established by the Commission'.[73] In its review of progress since 1959, which the committee adopted as part of its formal findings, the Commission estimated the public forest area to be about 1,720,000 ha, of which 1,120,000 ha was state forest and the remainder crown land. Of this total, about 800,000 ha was eucalypt forest with an understorey of wet sclerophyll or rain forest species; of this, about 24,000 ha cut over before 1959 had been regenerated. There had been some logging between 1959 and 1970 on about 100,000 ha but only about 12,000 ha of this had been regenerated because elsewhere either sawlog harvesting was not complete or no pulpwood logging had been carried out at all, though some areas would have been treated, where sawlog

harvesting had been carried out and little pulpwood remained, had more funds been available (an argument for financial assistance from the Commonwealth Government which the Australian Forestry Council was making at the time). Of the total public forest, about 500,000 ha was open-type eucalypt forest of varying productive quality which had been harvested in the past by a selection system which had promoted regeneration to some extent in the openings so created. The recent demand for pulpwood would enable the Commission to carry out economic integrated logging of the forest by clear-felling; this would lead to more effective regeneration and the creation of even-aged stands instead of the previous mixture of age classes and tree sizes.

When it came to 'policies and controls necessary to ensure ... regeneration', the Commission was at pains to point out that, whereas the Forestry Act not only gave it control of production on state forests but charged it with the regeneration of them, it did not have any long-term control of production on the other crown forested land and regeneration of it required the concurrence of the Lands Department. Control of the management and regeneration of forests on public land was 'adequate' only if that land was dedicated as 'State Forest' and, until this commercially forested public land was dedicated, the Commission considered 'the opportunity for planned regeneration cannot be assumed in the future'. In fact, the Commission was actively seeking to bring another 400,000 ha of this land into the 'State Forest' fold.

Public interest in and concern for the regeneration of the 680,000 ha (in later reports estimated at more like 1,000,000 ha) of privately owned forested land developed more slowly. A. D. Helms had sounded an alarm in 1947 when, commenting on the Tasmania Paper and Timber Mills Act 1946, he said:

> The creation of a ready market for pulpwood in many districts of Tasmania is making it possible for private property owners to realise on their forest assets to a degree which may ruin them completely during the next quarter of a century unless protective measures including legislation are introduced.[74]

But it took the greatly increased dependence of the woodchip industry on private land that became evident in the late 1960s and early 1970s — and the fact that much of this land was not being regenerated — to really arouse public concern. It was also clear from the various submissions to the 1970 Select Committee inquiry on the present and potential extent of the problem and what might be done about it that public concern over the future of the private estate was far greater than its concern for deficiencies in the regeneration program for the state forests or the lack of one for the other crown land. Although it recognised this in its report, the committee was apparently loath to

recognise it in its findings, for, apart from suggesting 'the establishment of a Private Forests Board or some other body to encourage and assist in the regeneration of forests on private land . . . should the existence of adequate private forests be threatened', and suggesting a few avenues of financial relief to private landholders by way of probate valuations, it was content to recommend that 'the regeneration of cut-over areas of private property be kept under review'. A critical evaluation of the report was carried out by the Environmental Law Reform Group of the University of Tasmania.[75]

Increasing public concern about the effects of the woodchip industry on the state's forest resource, particularly on the privately owned land, prompted the government to appoint a Board of Inquiry in September 1976 to which several questions regarding private forests in Tasmania were referred for review. In brief these related to (i) the present and future significance of the private forests to the state's economy; (ii) economic, social and environmental effects of changes in the use of these forests; (iii) practices to produce the most desirable form and standards of management of these forests, policies most appropriate to the formulation of these practices, most effective incentives to their use, and best means of implementing these policies and incentives; (iv) the best means of effecting cooperation with government and owners; (v) the extent and value of uses other than wood of these forests to the state; and (vi) the best administrative and legislative machinery for implementing the board's recommendations on these matters. After numerous sittings, a great many submissions and several overseas investigations, the board reported to the government in July 1977.[76]. It emphasised the importance of the private estate, occupying as it did (on the latest estimates) about a million hectares (thus representing more than a third of the total resource) and the close relationship between the crown and the private estates in their commitment to industry. Its recommendations may be summarised as follows:

1. A Forest Practices Act designed to establish proper standards based on a classification of forest lands and water courses, relating to the major operations and practices to be applied in the management of forests on both crown lands and private property should be introduced. The details of the Act should be developed on a regional basis by regulations.
2. Existing disincentives and obstacles to proper private forestry practices should be removed, and incentive schemes to provide financial assistance should be developed.
3. The amount a company could cut from private resources (other than from its own freehold) should be related to its quota from crown resources by a licensing system.
4. Liaison should be established between public and private sectors towards cooperative management.

5. A Private Forestry Division should be created within the Forestry Commission, headed by an additional Assistant Commissioner with appropriate staff, to promote the development, funding and utilisation of private forestry resources; and a Private Forestry Council should be established to complement the Private Forestry Division on primarily (but not solely) an advisory basis.
6. The whole field of corporation law relating to forestry investment companies should be examined.

W. S. Gentle, one of the two members of the board, has given a valuable, lucid account of the board's thinking which formed the essential background to the thrust of the report and the direction of its recommendations.[77]

The main findings and recommendations were accepted by the government and, in August 1977, the Commission was directed to draft legislation relating to the establishment of a Private Forestry Council and the office of Assistant Commissioner (Private Forests) to head a Private Forestry Division within the Commission. In December 1977 the Forestry Act 1977, amending the 1920 Act, was enacted to this effect. It was the first of its kind in Australia. The council was to consist of a Chairman and six representatives (of growers and industry) appointed by the Governor, with the Assistant Commissioner (as Deputy Chairman) and the Director of Agriculture as ex officio members. The Act requires the Commission to 'keep under review all matters relating to private forestry in the State and [to] make all such arrangements as it considers desirable in the public interest to promote the development and proper management of private forests and the utilisation of their produce'; and it empowers the Commission 'with the approval of the Treasurer [to] enter into and carry into effect agreements for rendering financial assistance . . . for the purpose of assisting the establishment, development or proper management of private forests or the utilisation of the produce thereof'. J. Quick, a regional forester with the Commission, was appointed to the new office of Assistant Commissioner in March 1978 and, by mid-1979, four financial assistance schemes, three relating to pine plantations and one to native forest regeneration, had been developed.

Following his 'inquiry into the structure of industry and the employment situation in Tasmania' carried out at the request of the Commonwealth Government and with the agreement of the Tasmanian Government in 1977, Sir Bede Callaghan reported that the Forestry Commission had suggested that 'employment opportunities could be provided expeditiously in reafforestation activities . . . if funds were available'.[78] As a result of this, the Commonwealth legislated through the Tasmanian Native Forestry Agreement Act 1979 to provide financial assistance on a dollar for dollar basis, up to a maximum of $136,000 for the year commencing 1 July 1978 for a

forestry program involving '(a) the establishment of up to 2750 ha of eucalypt plantation on former farmland owned by the State or on Crown land dominated by scrub or waste species (b) reforestation and rehabilitation of eucalyptus forests in the West Coast region of the State (c) thinning of blackwood regeneration in the North-West region of the State'; and for a similar amount or more in the following four years (1979–1982). Through the Tasmanian Native Forestry Agreement Act 1980, the Commonwealth legislated for an amount of $236,000 for the year commencing 1 July 1979, raising the plantation area to 3750 ha and including '(d) the acquisition of land for the purpose of establishing eucalypt plantations' in the program.

Conifer Plantations

Despite the great native wood resource, the early conservators in Tasmania were enthusiastic for coniferous plantations. There were extensive areas of 'wasteland' and their afforestation was a professional obligation (as well as a challenge); and softwood was needed to complement the native hardwoods. Although the vast scheme involving the employment and settlement of 'waifs of the Empire' of the early 1920s did not eventuate through lack of Commonwealth Government interest, and Rodger's recommendations of 1928 for a plantation program stood little chance of implementation in the economic depression of the time, planting commenced in 1922 on a small scale in the unforested plain country of 'the wasteland' of the north-west and west coast. By 1932 it was clear that these plantations would not be successful and, when soil surveys showed the sites to be badly deficient in nutrients, the Department turned in 1937 to the purchase of derelict agricultural land for more fertile sites. These were not without problems either. Most of them had been invaded by bracken, blackberry and 'scrub' and needed the protection of wire-netting, which was scarce and expensive, against attacks on the pine seedlings by rabbits, kangaroos and wallabies. Fire protection was also a problem.

Large-scale purchase of derelict farmland, of appropriate soil and topography and originally covered with the better types of eucalypt forest, began in 1939 and continued to 1948. P. T. Unwin, who carried out much of the valuation and purchase of this land, describes how the policy included purchase of adjacent blocks of good eucalypt forest so that together the blocks of plantation conifers and native forest were big enough to warrant economic use of manpower and machines in fire-protection and general management.[79] This policy, which is still followed by the Commission, explains the location of the plantations along the north coast region where land meeting these criteria was then available. The policy of 1939 was also to try to aggregate units of at least 200–300 ha within a radius of 80 km of a port or major industrial centre with an aggregate target of about 8000 ha, which

was considered sufficient at that time to support an integrated industry. Today an area more like 20,000 ha is thought necessary. Until 1960, planting continued on this purchased land with silviculture directed at producing sawlogs in the shortest rotation possible. By this time, there were about 6000 ha of plantation, most of it radiata pine, the first commercial thinning of which had started in 1950.

In view of the importance which the Commonwealth authorities had placed on preventing entry of wood wasps (siricids) into Australia from the earliest times, and the effects which *Sirex noctilio* was having on radiata pine plantations in New Zealand at the time, the short reference in the Commission's annual report for 1954 to the fact that 'a new line of research begun during the year was the establishment of an observation plot in the Pittwater plantation of *P. radiata* to record the incidence and effect of attack by the Sirex wasp' was laconic indeed. However, the low-key approach appeared to be justified in the following years when the infestation seemed to be confined to this one plantation, and Bass Strait seemed to be presenting an effective barrier against its spread to the considerably larger plantation resource on the mainland. When, however, the wasp was reported in radiata pine trees in Victoria in December 1961, there was a quick response by the Commonwealth and State Governments and commercial plantation owners to the creation of a National Sirex Fund to finance an immediate research and eradication program.

Until 1961, planting was confined to the abandoned farmland. In that year, problems in the coal mining industry in the Fingal Valley on the north-east coast, and the ensuing unemployment, caused the government to have the Commission consider a forestry project in the area capable of eventually employing upwards of 120 men.[80] A coniferous plantation, being labour intensive, was an obvious solution, but the Commission had no reservoir of derelict farmland in the region. However, there was sufficient state forest and crown land in the region bearing low quality, minimal-yielding eucalypt forest both satisfying the standard local criteria for plantation establishment and, from a production point of view, appropriate to the conversion. The region came close to satisfying the other criteria of size, location relative to a port or industrial centre and availabilty of labour. Within several months of the original request for consideration of a forestry development scheme, the Commission had reported favourably on its feasibility, the government had approved it and the unemployed coal miners had begun the first conversion of eucalypt forest to pine plantations which the Commission had undertaken. At the same time, the Commission began anticipating the usefulness of local provision of the longer-fibred coniferous wood, which forms a small though necessary proportion of a mix with hardwood fibre for most papermaking purposes, by increasing the annual planting program and by designing silvicultural schedules to produce pulpwood as well as sawlogs.

By 1966, the total area of softwood plantations was about 9000 ha with an annual program that had never exceeded 700 ha. The Softwood Forestry Agreement Acts brought an immediate and rapid escalation. During the next ten years, the total area was trebled to about 27,000 ha (more than a third of it in the Fingal area), the Commission rarely falling below its projected annual program of 1600–2000 ha and frequently exceeding it. It also managed to sustain a rate within those figures even when the Commonwealth assistance for planting stopped. By that time there were also more than 8000 ha of privately owned softwood plantations. In 1970, planting commenced at Strahan on the west coast, 'the modest beginning of what is eventually planned to be a major contribution to industrial stability in western Tasmania',[81] meanwhile providing work for waterside workers thrown out of employment when the shipping service to the port ceased. Ten years later, more than 2000 ha had been planted.

Fire

As so many people have pointed out, in formal and informal reports, the temperate nature of Tasmania's climate and the reasonably reliable rainfall means that bad fire seasons do not occur often; but, because of the accumulation of flammable material on the grassy plains and in the forests during the good years, when fires do occur they are likely to be severe. The intermittent nature of bad fire years has militated against the public concern about fire which is necessary for an effective prevention program. The severity of wildfires when they do occur makes suppression difficult. Except for the disastrous 1897–98 summer, which is fairly well chronicled (particularly 'Black Friday', 31 December 1897), there is not much of a formal record of the fires of the nineteenth century, but the various regrowth stands in so many parts of the state attest to a fairly vigorous fire history and even a short-term visitor like Hutchins saw enough in his inspections of 1914–15 to be 'shocked' at the destruction by fire. From the 1920s onwards, successive forest service heads recorded each season fairly faithfully and continually lamented the insufficiency of money, materials and men for effective fire control.

The nature of the fire situation was reflected in the fact that the first simple Bush Fires Act, the essence of which was to prohibit a landowner lighting a fire on another person's land, or letting one escape from his own, during December–March, remained essentially unaltered until an amendment in 1935, after bad fires in the summer of 1933–34. Then, more restrictions were placed on the use of fire and most of the power for the administration of the Act was vested in the Conservator of Forests in order to obtain tighter, more centralised control. The volunteer bushfire or rural fire brigade movement, which had already gained strength in some mainland states, had little appeal to rural communities in Tasmania, and rural fire control was effected

through a fire-warden system, and a Rural Fires Board with the Chief Commissioner of Forests as Chairman, set up by the Rural Fires Act of 1950, until 1967.

On 7 February of that year, Tasmania experienced a most disastrous fire, with considerable loss of life, property and natural resources, akin to the disaster in Victoria in 1939. The nature and extent of the forest destruction prompted the Commission to have A. G. McArthur and N. P. Cheney of the Forest Research Institute in Canberra investigate it, and their report was later appended to a comprehensive report on the disaster prepared for the government by the Solicitor-General (D. M. Chambers) and the Master and Registrar of the Supreme Court (C. G. Brettingham-Moore).[82] A committee inquiring later in the year into the rural fire organisation[83] found the warden system wanting and a much more comprehensive system, outlined in detail by Luke and McArthur,[84] was introduced by a new Bush Fires Act of 1967.

Land Use and Forest Multiple Use

The scenic nature of much of Tasmania was recognised from the earliest settlement. Some attempt at formal reservation to preserve it had been made by the turn of the century, which saw the formation of amateur bodies in Tasmania, as in mainland Australia, pressing the government for the implementation of 'national parks'. A Scenery Preservation Board, set up under the Scenery Preservation Act of 1915, was instrumental in having a number of reserves proclaimed during the next fifty years.[85] In the renewed concern for the environment and reservation in the 1960s, it became clear that the existing legislation was inadequate for its purpose and a National Parks and Wildlife Act of 1970 (effective November 1971) was eventually proclaimed creating a National Parks and Wildlife Service with appropriate authority and responsibility for the management of a wide range of reserves that had already been established (e.g. national parks, state reserves, nature reserves, historic sites, aboriginal sites) and for the creation of more of them.

Because of the close affiliation of many Tasmanian people with their physical environment, the feelings which many mainland visitors have developed for the special scenic nature of the island, and the fact that the attractiveness of much of the land derives from those very features which provide great opportunities for resource development (e.g. its water, forests and minerals), Tasmania has provided a ready-made setting for intense battles of 'the environment versus resource development' during the last twenty years. In the late 1960s and the early 1970s, for instance, it was to gain an international audience and participation for the 'Lake Pedder controversy'. The long history of this event, the arguments around the inclusion of the lake and its environs in a hydroelectric water impoundment scheme,

the eventual flooding of the lake, the enormous amount of reference material generated during the conflict, and lessons that might be learned from it by governments and people for more satisfactory and happier resolution of such future conflicts in Australia are amply covered in the 1974 report to the Commonwealth Government by the Lake Pedder Committee.[86] The effect of 'Pedder' was to heighten the opposition of strongly conservation-minded people to any development which pre-empted other land use, and it was inevitable that the rapid extension of the hardwood woodchip industry would appear to them as yet another example of an insensitive government, backed by an equally insensitive bureaucracy, single-mindedly directing itself to resource development with little or no concern for the consequences to the environment, either in the short or the long term, or for the possibilities of alternative or multiple use.

The apparent pre-emption of all crown forested land for wood production by the allocation of the concessions covering the greater part of the state confirms such an image, and the statistics of the extent of the forested area under the authority of the Commission colour the issues in the battle which continues to rage over 'The South West'. The Commission estimates that the total forested area of the state is of the order of 2.7 million ha, of which 1.4 million ha are state forest, 200,000 ha other crown land, one million ha under private tenure, and 100,000 ha included in national park type and similar reserves. That is, roughly 50 per cent of the forested area is allocated to the Commission for 'multi-purpose management with wood production as the major object of management'. Although specific wildlife preservation is carried out through management planning approved by the National Parks and Wildlife Service on something like 300,000 ha of this, and there are about 4000 ha of various special reserves (e.g. under the Forestry Act 1975),[87] the contrastingly small area of forest within national park type reservation from which wood harvesting is excluded is a ready focus for the energies of those who would prefer a less disparate allocation. Much of this energy has been directed to campaigning for a substantial increase in reservation of land in the south-west for national park type purposes, including a substantial increase in the forested land already dedicated. The conservation arguments are presented in a wealth of material but particularly in *The South West Book*.[88] The Commission's views on the matter are available in it and elsewhere.[89]

In response to the pressure for large-scale reservation of the area, the government produced a draft management plan for an enlargement of the South-west National Park, as it had been proclaimed in 1968. This provoked more criticism than it satisfied and the Minister for National Parks and Wildlife appointed a South-West Advisory Committee (the Cartland Committee) in November 1975 to investigate the matter. The committee's report was tabled in September

1978. It recommended a considerable extension of the existing conservation area and that the National Parks and Wildlife Service should prepare 'National Park and Conservation area management plans for the whole of this area as a matter of priority'.

The implications of this to the Forestry Commission were that these plans might well nullify the supply of wood from forests included in the conservation area, which were by legislation already under lease, concession, agreement, contract, etc. to industry, and in 1979 the Commission sought special legislation to ensure that no alterations could be made to a forest management plan which assured the wood supply to such industry unless they had the certified approval of the Commission.[90] An amendment to the Forestry Act in December 1980 provided that the Commission, in consultation with the National Parks and Wildlife Service, shall prepare 'forest management plans' for areas that are both conservation area and state forest (or a timber concession). Such plans must have opportunity for public input but, without the concession holders' agreement, must not reduce existing 'private forestry rights'.

The major conflict between the Commission and those pressing for the reservation, for wilderness values, of areas such as 'The South-West' in which the Commission and the wood industry have an interest, centres on the incompatibility of wilderness and any form of wood-production operations. The Commission sees further reservation for wilderness as a loss to wood production and it sees the present reservation of wilderness as sufficient for this purpose. It points to its multiple-use policy, which, with wood production as the primary object of management, results in the situation that 'all State Forests are open for public use except during periods of extreme fire hazard', and some 6500 km of forest roads are available for public access'. In addition, the Commission has 'dedicated 50 special reserves [covering] 3600 ha of forest land' and has embarked on detailed planning for multiple use (with wood production as prime use) on two areas totalling about 10,000 ha. The Commission sees this as a 'correct compromise between production forestry and wilderness values'.[91] Conservation interests see the compromise as quite unacceptable.

CHAPTER 3
Queensland

Early Settlement

Early in the nineteenth century, people in both Britain and Australia were questioning the purpose and effects of colonial policy. Many of their questions were brought into focus by problems of Macquarie's governorship, which Secretary Bathurst used as an excuse for an investigation of the colony. This he entrusted to John Thomas Bigge, whose three lengthy reports of 1822–23[1] were to have far-reaching effects on the future development of Australia. One of these was the beginning of settlement in Queensland. One of Bigge's major concerns was the disposition of convicts in Australia, their stratification by levels of crime and their separation from free settlers. He recommended the segregation of the worst offenders in new penal settlements north of Port Macquarie, which had proved insufficiently remote from Sydney for that purpose, at Moreton Bay, Port Curtis and Port Bowen. To this end, Governor Brisbane, who had lately assumed office from Macquarie, sent Surveyor John Oxley in the *Mermaid* to examine 'the capacity [of these sites] for the purpose of convict settlement'.[2]

Oxley arrived in Port Curtis on 5 November 1823 and concluded after lengthy examination that it did not afford an appropriate site for a settlement. The opposing winds, the heat and the wet season led him to defer going north to Port Bowen and he returned south to Moreton Bay.[3] Anchoring in Pumicestone Passage close to the southern tip of Bribie Island, he was greeted from the shore by a group of Aborigines and a white man, Thomas Pamphlett, one of the survivors of a party of four which had left Sydney eight months earlier in an open boat to bring cedar from the Five Islands about eighty kilometres to the south of Port Jackson and had been blown by a southerly gale to Moreton Bay. The next day Oxley also took on board one of the other survivors, John Finnegan. He and Pamphlett told Oxley of a large river entering the bay and Oxley, Lt. Stirling and Finnegan set out to explore it in a small boat. Oxley was impressed with:

> timber of great magnitude [including] a magnificent species of pine . . . in great abundance [which] if it should prove of good quality were of a

> scantling sufficient for the topmasts of large ships . . . some measured upwards of 30 inches in diameter and from 50–80 feet without a branch.[4]

This was hoop pine, later named *Araucaria cunninghamii* in honour of Alan Cunningham, who identified it as an Araucaria on an expedition with Oxley in September 1824. A superlative softwood, it was as welcome a find to the early settlers as cedar was to Sydney and Huon pine to Hobart Town, and was to play a leading role in the history of forestry and the development of forest policy in the state.[5]

Oxley brought back good reports of Moreton Bay and it was decided to found the penal settlement there. In late 1824, settlement was begun on the site of modern Brisbane by a group of convicts and guards under Lt. Miller as commandant. After fifteen years, its penal role was reduced considerably and three years later it became a free settlement, mainly a coastal centre for the cattle squatters, who gradually fanned out north and west.

As development spread, the fine stands of eucalypts and the sub-temperate rain forests were an immediate source of wood for a wide range of uses, both locally and for export to the south. The coastal eucalypts were particularly attractive to the timber-getter and, thirty years after Oxley's first explorations, timber was being milled 200 km north of Brisbane in the Wide Bay region and logs were being exported to Sydney. By this time, bunya pine and kauri pine had also been discovered, though some protection was given to the former because of the importance of the seed to the Aborigines. The major attraction, of course, for export to the southern market eager for cabinet woods and especially one of such quality, was red cedar; and one of the pieces of legislation enacted when Queensland gained its independence in 1859 was aimed at controlling the cedar-getters. Like similar legislation in New South Wales, this remained largely inoperative for many years. The bushcraft and ubiquitous nature of the cedar-getters militated against the practicable implementation of any royalty system especially as by the 1870s they were 1600 km north of Brisbane in the great cabinetwood resource of the Atherton Tableland rain forests west of the port of Cairns, which was founded on Trinity Inlet in 1876.[6]

It was about this time that there was written what the Hon. J. H. Coyne, MLA, Secretary for Public Lands, was later to describe as the 'first chapter in forestry in Queensland' at a public meeting in Brisbane in May 1873 held under the auspices of the Queensland Acclimatisation Society 'to bring home to the Government of the day the all-urgent question of forest conservancy'.[7] As a result of this meeting, the government appointed a Select Committee of parliamentarians in June 1875 'to consider and report upon the best means to be adopted in order to preserve and promote the growth of timber

trees and to conserve forests for useful purposes'. The committee took evidence from fifteen witnesses with a wide range of interests and concerns. It commented that there had been a shameful waste of valuable timber, which should be checked, and recommended that legislation be enacted to prevent the export of cedar logs except on conditions more favourable to the colony than at the time, that reserves be proclaimed, that timber-getters be supervised by rangers, that cutting be regulated by a size limit, that ringbarking be prohibited, and that a Forest Conservancy Board be appointed to assist the Minister. Although the committee thought a Conservator at the head of a Department might be justifiable, they felt in the first instance that a board of three members (with a small honorarium) might suffice to assist the Minister.[8]

But the rate of use and abuse of the forest resource was clear to many people. R. M. Hyne, who had established a mill and the beginnings of a sawmilling dynasty at Maryborough in 1882,[9] expressed his concern as a member of the Legislative Assembly in September 1889, with considerable support from other members in the House, that something be done to halt the rate of exhaustion of the forests and that a Department of Forestry be created.[10] A royalty system was introduced by The Crown Lands Act of 1884. The timber-getter was required to pay an annual licence fee of five shillings and a royalty on the amount and kind of timber cut. There was some public opposition to this, and it was discontinued in 1888. From then until 1905, only a licence was required for a timber-getter to cut as much as he wanted on the crown estate. Regulations made in 1886, with a view to reducing speculative selection by restricting the cutting of timber on selections within the first five years of the lease without the approval of the Land Commission, had been only partly successful.[11]

The First Legislation and the First Director

Until 1900, the supervision of forestry interests was entirely local, being in the hands of Land Commissioners, who were required to keep their head office informed of the discovery of any areas of valuable timber in their districts which they thought should be reserved, and who administered the timber regulations. In 1900, a Forestry Branch was set up in the Lands Department to supervise crown land activities and G. L. Board, a Land Commissioner of one of the more important timber districts, was appointed to head it as Inspector of Forests. He was succeeded by P. J. MacMahon in November 1905, when the title was changed to Director of Forests. MacMahon's first report, after only two months in the job, was understandably short and, in view of the previous eighty years of forest use, inevitably echoed the thoughts of pioneer Directors of Forests elsewhere:

> the work of the forest rangers has been almost wholly confined during the year to the work of excising from the timber reserves areas suitable for settlement, in reality working in the interests of land selection rather than in that of forestry . . . It is essential that definite areas of land should be set apart for forest purposes and brought under forestry management. This is the forestry problem condensed.

In view of the value of the forests and the supply of wood to the state, he also thought that it would not seem too much to ask 'that at least half the forest revenue be earmarked for the purposes of forest demarcation, conservation and development'. Expenditure at the time represented 6 per cent of the revenue.[12]

In December 1906 'An Act to provide for the Reservation, Management and Protection of State Forests and National Parks' was assented to. Its main effect was to give the Governor-in-Council power to reserve crown lands as 'State Forests' or 'National Parks', their alienation in whole or part being possible only by Act of Parliament (with some minor reservation under the Lands Act), to appoint officers to implement the Act, and to make regulations for managing forests and parks, and for defining and disposing of forest products. It was simple, it was limited, but it was a step forward; and it established the administration and management of national parks in Queensland as a function of the Forest Service, a unique arrangement in Australia that was to last for nearly seventy years. It was unfortunate that the regulations which would give it teeth were not to be gazetted until 1914.

After a year in the job, the Director warmed considerably to his report writing. He was not new to the forestry scene. As a result of the debates in the House in 1889, MacMahon had been asked by the Minister for Lands to report on the forestry situation. He had then submitted a number of suggestions, none of which he said in 1907 he had need to alter — and none of which, he might also have said, had been implemented. For his time they were far-thinking, including the opinion that 'a few of our smart young Queenslanders, selected from country schools and given a special training such as they could obtain in this Branch, would make ideal foresters'. Now he was pressing the need for forest demarcation, preservation of the integrity of the reserves, and a more equitable distribution of reserves over the state. Expenditure relative to revenue was small. But what would he do with more revenue? In his own words, one may as well ask 'a starving man what he would do with a bath bun'.

The timber lands of the state had been classified into accessible, difficult and non-accessible. The first of these classes was being cut out many times faster than it was being replenished by natural means and could not, within the limits of practical politics, be replanted. The second-class lands were waiting their turn to be placed in Class I and

to be in turn destroyed. MacMahon hoped the 1906 Act would result in greater control but drew attention to the fact that a similar provision had been on the statute book in Victoria for the last forty-six years and that period had seen the greatest destruction of its forests, prompting even its Premier to remark: 'We . . . have acted as goths and vandals to our forests'.

MacMahon was absent from head office on inspections '145 days exclusive of Sundays' but still managed to 'look at 583 files, receive 466 letters and write or dictate 926, assisted only by a junior clerk'.[13] Until he died in 1910, he worked ceaselessly to establish a department, to increase revenue and ensure an appropriate reservation of forests for the state's future needs. At the time of his death he was working on an inventory of the 1.5 million ha of state forests and timber reserves to ensure that the area was adequate in quality and quantity. Wherever and whenever he could, he stressed the importance of forests to a country, comparing and contrasting the position in Queensland with that in the more forestry-advanced countries of the world. Fearing in his final report he might too long have pressed the obvious, he said, 'but I have no right to assume that every thoughtful man, particularly every statesman, is not as fully seized of the importance of this matter as I or anyone else can possibly be and so in confidence [it] may be left to time and opportunity'. It was a reflection which time would show was too generous although worthy of the man.

A paragraph in the report of the Under-Secretary of the Department of Lands in the year of MacMahon's death comments on a situation with which a large element of forestry policy in Australia has been involved since then and is the crux of one of the important conservation issues of today.

> It is an unfortunate circumstance, from the standpoint of forestry, that the State's best soft woods are found on its best soils. The maintenance of the rich volcanic coastal scrubs as permanent reservations for forestry purposes cannot be regarded as a subject for serious consideration. The demand for such land for close settlement becomes more and more pressing and each year sees additional areas of such land as the timber becomes cut out, excised from the reservations and opened for settlement. How far the excellent indigenous pines of this State can be reproduced on soils inferior in quality to that on which they are now found to be naturally produced is a question yet to be determined. It seems not improbable that in the not distant future the needs of the inhabitants of Queensland, so far as regards pine timber, will have to be met by exotic varieties of inferior quality, secured by importation in a manufactured state, or from local plantations on land not capable of producing the indigenous varieties.[14]

It was a realistic, perceptive and, for a Lands Department Under-Secretary of seventy years ago, an usually sympathetic assessment.

Technical Forestry Begins

In 1911, the vacancy caused by MacMahon's death was filled by N. W. Jolly, then an Assistant Conservator with the South Australian Woods and Forests Department and instructor at the Adelaide University School of Forestry. In his first annual report he noted that previously emphasis had been laid on reservation and revenue collection, but he thought that the time was more than ripe for two fundamental principles to receive attention. One was the need to determine the annual permissible cut from crown forest, which should be related not to the demands of industry but to the area of reserved forest and to the distribution and growth rate of tree species and sizes on those forests. The other was the pressing need for the regeneration of the native forest by natural means.[15] He saw the need for firm growth data rather than speculative (and usually exaggerated) estimates and he established growth plots for broadleaved and coniferous species.

The expansion of the infant service proceeded slowly. Jolly pressed for professional staff to supervise the treatment and regeneration of the forest, and for a school to train them. In 1913, revenue collection and supervision of timber-getting operations in the main timber areas had passed from land rangers under local Land Commissioners to forest inspectors under the Director. But they had impossibly large areas of supervise. The attacks on forestry for standing in the way of settlement continued, a charge which Jolly showed to be untenable by the small proportion of the total area of 1.5 million ha of state forests, timber reserves and national parks which was in the productive coastal belt and could be in any way considered as economic for conversion to farm or pasture. The surveys, started by MacMahon, were demonstrating and emphasising the large proportion of non-productive area in the reserves and the unproductive nature of much of the rest. At the fourth Interstate Conference on Forestry at Perth, November 1917, he gave a thoughtful paper on the forest reservation necessary for the next sixty to seventy years in Australia, both for timber supplies and the other services of the forest. He emphasised the desirability of a national view, even suggesting that the alienation of state forest reserves be referred to Federal Parliament before being allowed. The need to replace the native hoop pine was abundantly clear and, when 1917 brought an unusual crop of fertile seed, considerable effort was put into observing the behaviour and requirements of natural and artificial regeneration. The luxuriant growth of weeds in the first year was a problem; they could perhaps be suppressed by an agricultural crop.[16]

The report by the ubiquitous D. E. Hutchins in 1916[17] had nothing complimentary to say about Queensland except to praise the wonderful timbers its forests had contained. If its 'denunciations' were intended 'as a trumpet blast' to startle the government 'out of our

long sleep',[18] then some purpose was possibly served, but it was a pity that, in rousing the State Government to its responsibilities, Hutchins did not acknowledge the good work that had been done by two hard-working Directors in hostile circumstances in the short space of ten years. His report was filled with vague generalities, exaggerations, much trumpeting and few constructive suggestions. Jolly's response, in his paper to the fourth Interstate Conference, to Hutchins' wild recommendations regarding reservations, was undeservedly gentle in the circumstances.

Jolly resigned in April 1918 to become one of the Commissioners in New South Wales.

Firm Foundations in a Turbulent Period

In E. H. F. Swain's own words, 'world wide advertisement was resorted to by the State in the selection of Mr Jolly's successor'.[19] After his disappointment at not being made one of the Commissioners in New South Wales a few years previously, and his move to Queensland as District Inspector for the Gympie and Nanango Districts at the end of 1916 as a result of this, he must have been waiting impatiently in the wings. He was called to his new role as Director when Jolly resigned. He would have enjoyed the introduction to his first annual report by the Minister of Lands, which included a fulsomely complimentary quotation from the classic 'Sylva' written by John Evelyn in 1664. However, his enjoyment of it would have been tempered in retrospect, a decade or so later under less sympathetic political masters, by the Minister's further exhortation, that:

> exploitation of the natural resources must give way to conservation by right use. The future prosperity of the State depends in large measure upon its forests, and no policy of land settlement can be adjudged complete which does not include that nationalised form of farming for which Governments are held peculiarly responsible, and which is called forestry.[20]

In his first annual report for the Queensland Forest Service, Swain set the pattern of his thoughts as Director and the basis of the program that was to occupy him for the next fourteen years. The elemental needs of the state, he said, were:

> constitution of a definite and sufficient forest estate; a strong forest redemption policy; reinvestment in forestry of forest surpluses; a modernised Forestry Act; establishment of an independent forestry service; strengthening of the forest staff, particularly on the technical side; a forest products laboratory.[21]

The rationale for this, and the means whereby he hoped to achieve it, are presented and argued in his numerous articles and public speeches

and in his subsequent annual reports to Parliament, which are a clear record of his progress toward the goals he set in his first report. He saw silviculture as the pivot of forestry: on the correct silvicultural processes depended the productivity of the forest to meet state needs. But effective silviculture depended on effective utilisation, and the technology of wood and markets for it were therefore critical.

These thoughts pushed him towards a program of intense investigation into the properties and uses of Queensland woods and the growing of quality wood, an understanding of the growth habits and silvicultural characteristics of the native forest species, and to an involvement with marketing. The Minister, J. H. Coyne, was showing a positive interest. He reiterated publicly that:

> the State forests were essentially Governmental timber farms and that forestry was to be practised thereon as a form of land settlement, yielding permanent occupation and permanent residence to a large population who should be engaged thereon in sowing, growing, harvesting and marketing the State's timber crops,[22]

and he presented a heartening position of the forest service at the fifth Interstate Conference on Forestry at Hobart in 1920. Particular attention was drawn to the large increase in staff, especially the employment of 140 soldiers returned from World War I. At the same conference, Swain presented a paper arguing for a minimum area of 12 million ha of forest reserves for the Commonwealth (roughly twice the total at the time, Queensland's quota being 2.8 million) and a paper on financing forestry in Australia which argued for Commonwealth Government support of the States' operations.

In 1919, state logging commenced and timber was sold at auction on the railway ramps. In 1920, the sawmills which had been bought by the government in 1916 in a mood of state enterprise were merged into the forest service, thus giving Swain an opportunity to demonstrate how sawmills and timberyards could be integrated with the general aims of forestry, at the same time providing a valuable source of data for stumpage appraisals and the setting of royalties.[23]

1922 saw the appointment to the Service of V. A. Grenning, who had gone to Oxford as Queensland Rhodes Scholar for 1919 and had gained tropical experience in India and the Pacific on his way back to Australia. It also saw the development by District Forester Weatherhead of the planting tube, which was to revolutionise the establishment of hoop pine plantations because it allowed planting of the seedlings immediately after the clearing and burning of the slash on the planting site in mid-summer and so reduced the competition from the heavy crop of weeds which the pine suffered if planted in the following winter. It saw, too, Queensland as host to the sixth Australian Forestry Conference.

Swain sought from the conference support for legislation to enhance the 1906 Act and the opinions of delegates on necessary elements of it (e.g. the best form of headship of a forestry organisation, the proportion of revenue which should be reinvested in forestry, the need for loan funds, the advisability of concessions, the licensing of sawmills and the desirability of the involvement of forestry organisations in harvesting). On these subjects the delegates provided a very wide spectrum of views. The conference finally recommended that the Minister consider the early passage of a Forestry Bill along the lines of those in all the other states, in particular providing for an authority based, as in the terms of the Western Australian Act, under the control of the Minister for Lands. It also recommended the reservation of 2.5 million ha of permanently reserved forest, reinvestment of 50 per cent of revenue, the use of funds from consolidated revenue for administration and of loan money for afforestation, and the adoption of a clear-cut, comprehensive forestry policy.[24]

In his report for 1923, Swain submitted several proposals for the reconstitution of branches and reorganisation of personnel. The basis of his report was that the Service should be divided and reorganised along the lines of its two main functions: (i) the sale of the old crop, which included all the forest engineering, harvesting and marketing processes, the revenue-producing branch of the Service; and (ii) the production of the new crop, which included all the silvical, forest organisation and reforestation measures, the reinvestment aspects of the Service. He thought the former processes should be centred at head office with the Forest Engineer, and the latter with the Silviculturist, and that these two lines of action should be carried through to the field as far as possible without merging under local District Forester administration.

In October 1924, the Forest Service ceased being a branch of the Lands Department headed by a Director. A new administrative authority was established in the form of a Provisional Forestry Board of three members, responsible directly to the Minister for Lands, operating through three main branches as Swain had proposed — Harvesting and Marketing; Administrative, Secretarial and Accounts; and Working Plans, Silviculture and Surveys. For the organisation of field operations, the state was divided into Regional Working Plan Areas, in each of which the two processes of the sale of the old crop and the production of the new crop were kept separate and coordinated at head office through the Board — a principle which has carried through to a large extent to the present day. The 1914 State Forest and National Parks Regulations were repealed and new ones promulgated to take effect from November 1924.

The Board took a long, hard look at the resources of the state, the rate at which they were being cut (particularly the hoop and bunya pine stands), and the likely needs of the likely future population. Even

for its immediate future, the state's needs were such that it had to engage in an annual program of 6000 ha of natural regeneration of the native forest and the establishment of 2000 ha of coniferous plantation. To the latter end, an experimental station was established at Beerwah, about 80 km north of Brisbane, to try out various coniferous species from the south-eastern United States, particularly slash pine (then *Pinus caribaea*, now *P. elliottii*), loblolly pine (*P. taeda*) and pitch pine (*P. palustris*), with a view to afforestation in the extensive area of 'wallum' (the mosaic of heaths, tea tree swamps and eucalypt ridges, within the great coastal lowland belt extending for several hundred kilometres northwards from the border with New South Wales), for which there was at that time very little demand.

Up to this time, the Forest Service drew its field staff from sources such as the experienced land surveyors, who were especially useful in the work of assessing the state's forest resource. Many of them, such as J. L. Tardent, remained with the Service for many years making valuable contributions over a wide range of forest management problems. But the need for professionally trained foresters was clear, and in 1924 a cadetship scheme was started involving a two-year course at the University of Queensland followed by a two-year course at the Australian Forestry School. Six cadets completed the university course in 1925, and five of them (A. H. Crane, A. J. Owens, W. F. C. Pohlman, M. A. Rankin and A. R. Trist) went on to the Australian Forestry School (then located at Adelaide) in 1926, obtaining degrees in forestry from Adelaide University.[25]

In 1926, the Board carried out a complete review of the activities of the Service and outlined the rationale of its policy with regard to the supply of coniferous wood — a policy that was still being pursued fifty years later. Its genesis lay in the fact that, in Swain's terms, 'an aboriginal insufficiency of building softwood exists for the needs of the civilised State'[26] and, at the current rate of depletion of hoop, bunya and kauri pine from crown and private lands, the resource would be used up by 1938. Recognising a responsibility to the public and an extensive industry dependent on this supply, the Board considered it better to ration the cut over a longer period and, by dilution and import, to ease the decline of native wood down to the point when the man-made forests would start to lift supply again. A planting program of 2000 ha per year would provide '100 super feet per head per annum' for an anticipated population of three million in 1996. Since Brisbane was the major population centre, its market was the first point of attack. As to the constituents of the planting program, the intention would be to plant hoop pine wherever possible. Swain saw little use in Queensland for radiata pine, that 'gross and gawky tree'[27] which was creating a furore in forestry circles in southern Australia and New Zealand, except in the Toowoomba–Stanthorpe area, where it might grow and provide case material for

the fruit growers. The most likely exotic conifers to make up the deficiency in supply resulting from the limited availability of land for planting hoop pine were slash and loblolly pine, then showing promise in the wallum.

The British Empire Forestry Conference held in Australia and New Zealand in 1928 gave support to the Board's continuing representations to government of the need for a more comprehensive Act than that of 1906. The conference particularly emphasised the deficiency of the Act with regard to finance, each year's activities of the Service being dependent on the capricious availability and distribution of loan funds. Swain's emphasis on the need to extend utilisation in the direction of lesser used species of the mixed subtropical forests led to the development by the Wood Technological Branch in 1923 of a Universal Wood Index System which allowed the classification of the woods of the state. In 1928, the work of the Branch (particularly that of C. J. J. Watson) in the ten years since it was established on the identification and industrial application of the wood of more than two hundred native trees was made available in a large publication *The Timber and Forest Products of Queensland.* It was a monumental work which drew favourable reviews from many parts of the world.[28] Swain was also establishing the pattern of production of quality wood, which was to become, and is still, an essential element in the objectives of management of the coniferous plantations. In his 1929 annual report he notes:

> as every [hoop pine] seed carries the characteristics of its ancestry, the Forest Service made sure of one of the parents by gathering the seed supplies only from carefully selected individuals yielding ply quality logs. These individual trees were marked months previously and preserved against the logger until their seed crops were ripe.

From 1930–31, Swain said in his report for that period, '[there] dates an era of sound development of the forest and timber industries for the State . . . [It] will have marked the beginnings of a true understanding of the essentiality of the forests and forest management in Queensland'. A few days before that he had submitted a confident refutation of a series of denigratory charges levelled at him by a Royal Commission. Forestry seemed not only to have survived the fire of the commission but to have arisen new-born. 'The year,' he said 'will come to be regarded as the most critical in the history of forestry in Queensland.'[29] It was certainly the most critical in his own eventful history — within twelve months his services were dispensed with.

The cause of his temporary euphoria was a number of government sponsored investigations into various aspects of forestry which took place during the year. Two problems were particularly pressing. One was the parlous state of the local timber industry, whose condition in

the general economic depression of the time was exacerbated by a glut of imported timber. Towards the end of the year, a large conference of industry representatives had been convened by the Minister for Lands, and it was anticipated that a Timber Industry Advisory Committee selected from it to inquire into a number of aspects of the timber trade would come up with a number of beneficial propositions.[30]

The other problem had to do with the allocation of land to forestry and the pressure from various sources for its release for settlement. A Parliamentary Party Committee had looked at the matter. One of its recommendations was the setting-up of a Forest Boundaries Committee which would investigate the forest and timber reserves of the state, hear claims and disputes over their boundaries and advise the government on their retention for forestry purposes or their modification to allow other uses, particularly in view of a recommendation by Parliamentary Committee that 'a nett area of 400,000 acres should be reserved for softwood planting in southern Queensland'.[31] The terms of reference were wide and committees of forestry and agriculture officials in cooperation carried out intensive inquiries and submitted detailed reports which were subsequently to provide a valuable base for planning the coniferous plantation estate. The reports were compiled and received with marked lack of controversy.

The same could not be said of the report of the Royal Commission set up by the government in May 1931 to consider forest boundaries in the northern part of the state. It had wide terms of reference to inquire into a number of matters relating to the development of north Queensland:

(1) The situation and areas of virgin land situated north of Ingham that are suitable for closer settlement.
(2) The development works that would be required before the land could be made available for settlement.
(3) The purposes for which the land could be used, and the areas, prices, terms and conditions of settlement generally.
(4) In relation to Forestry Administration:
    (i) The land which should be permanently reserved for State Forest purposes.
    (ii) The land which should be temporarily withheld from settlement pending the disposal of timber thereon and the best means marketing such timber.
    (iii) The lands which should be immediately made available for settlement.
    (iv) The suitability or otherwise of the method now in force for harvesting crown timber.
(5) Generally a definite programme of land settlement and forestry activities in the tropical north for the ensuing decade.

Swain viewed it as motivated entirely toward ensuring electoral success in north Queensland by throwing open 'the cabinetwood forests of north Queensland to "settlement" for timber trafficing [*sic*]',[32] a motivation and means entirely alien to his philosophy. The Chairman nominated for the commission was the Chairman of the Land Administration Board, for whom Swain had already established a strong antagonism. It was inevitable that Swain would take the fight to the 'enemy'; his nature and the circumstances would allow him to do nothing less. He 'preceded [the commission] to the north and organised witnesses against it'.[33] He compiled a large report as his evidence to the commission,[34] and, having presented it, he distributed 'three hundred copies of my evidence-in-camera to the Press of Queensland and interested bodies and persons!'[35]

The record of settlement being what it was, his report was hard-hitting: 'unfortunately, if I may be forgiven for saying so, the region under review has been settled without plan or purpose, and, in consequence largely of bad land classification surveys and helter-skelter settlement policies, grave economic maladies have supervened'.[36] It was expectedly biased towards forestry: 'the destinies of North Queensland are inextricably linked up with the cabinetwood forests which are its natural expression'.[37] Neverthless, his 'economic remedies', based on the proper organisation of forest industries backed by production from other crops which he enumerated in detail, must have made persuasive reading to anyone genuinely interested in the development of the region. And it did set out to illustrate in detail Swain's charges that, over the fifty years preceding the inquiry,

> the Lands Administration of the day disclosed itself as merely a wholesale land opening agency, having no perception of the developmental importance of natural resources, no appreciation of conservation principles, no idea of land economics or of land utilisation, no policy at all except to parcel out the country into industrial blocks regardless of consequences or of topography, and to tab each with an owner's name regardless of his qualifications or of his bona fides.[38]

The response of the Chairman of the Lands Administration Board, even in the role of Chairman of a Royal Commission, was predictable in the circumstances. The report readily acquitted the forestry officers of any improper motive in preceding the commission to the north and preferred to see this action as merely 'a mistaken notion of duty and a somewhat ill-balanced enthusiasm for the cause they were advocating'. The commission was also prepared to make allowance for the 'contentious atmosphere' set up by 'their continuous and aggressive propaganda' though, because of it, forestry in Queensland was fast 'becoming more a problem in psychology than a problem in economics'.[39] However, the commission was not disposed to be so

generous in its reaction to the evidence of the Forestry Board, in the preparation of which

> facts seem to have been sacrificed for sensationalism. Brilliantly worded with typically audacious and reckless forest propaganda, fundamentally wrong in argument, grossly inaccurate in figures and in narrative, it reads in part more like imaginative fiction than sworn evidence for the consideration of a Royal Commission.[40]

The commission's response to 'the forestry case against land settlement' was to say, 'It is serious enough for a Public Department to mislead the Press and the public. It is more serious still for Public Officers to make false statements on oath and to attempt to deceive a Royal Commission.'[41] The commission's view was that 'Queensland needs no forestry science for present requirements . . . The productive wealth of the country at present suffers from the fact that there are too many, rather than too few trees'.[42] The commission leaned heavily towards a settlement program. To the charges that it had attempted to deceive the Royal Commission, the Forestry Board issued a prompt and detailed reply through the Minister for Lands with a general affirmation by the Auditor-General of certain quantitative statements of its evidence.[43]

Swain's services were terminated on 1 October 1932. A week later Grenning submitted the annual report for 1931–32 as Acting Director of Forests on behalf of the old Provisional Forestry Board and the new Forestry Board which had been created to take its place in the previous April. By this time the Forest Service had been made a sub-department of the Department of Lands, the Land Administration Board had been constituted to be the Forestry Board, and Grenning, as Director of Forests and responsible for the running of the sub-department, was made a member of it. In view of the events of the year he was reporting on, the issues of the provision of land for forestry and the rightness of forestry's claims for it were rather sensitive and Grenning could have been excused if he had chosen to skirt the subject altogether. In fact he took the opportunity to push forestry's claims, delicately but firmly, and to underline Swain's plea of many years standing for a Forestry Act which would give the state the 2.5 million ha of reserved forest (which the government had publicly accepted as its contribution to the national total but had done little to effect) and which would also provide adequate, guaranteed funding for the job the Service was obviously expected to do.

Four Decades of Steady Progress

Administration

Grenning continued to head the service until 1964, a thirty-two year term whose length has been unrivalled in forestry in Australia. After the North Queensland problem, he needed little persuading that

things would be a lot better for forestry out on its own rather than under the supervision and control of the Lands Department, the views of which, by the very nature of people and things, were always likely to be at variance with those of its sub-department of Forestry. But it took twenty-five years for the government to agree to make the break and for Forestry to become a Department in its own right. Legislation assented to in December 1959 and made operative from August 1960 consolidated various authorities under which the Department functioned and which had previously been scattered through other legislation. The title of the chief officer was changed to Conservator. While this seemed a small thing in itself, it was part of a concerted plan of the Department to bring to public notice in any way it could its philosophy of general conservation rather than just one of wood production, especially in view of its role in responsibility for the national parks. In June 1960, its status was further enhanced by recognition for the first time in a ministerial portfolio as now being responsible to the Minister for Agriculture and Forestry, having previously been responsible to the Minister for Lands.

Grenning was succeeded by A. R. Trist, who had been one of the state's first forestry cadets and one of the first graduates of the Australian Forestry School. Swain sent him to Yale and, while in the USA, he took a particular look at the southern pines to see if they might be suitable for Queensland; and on the way home he visited South Africa, whose silvicultural experimentation with the American conifers he was to transfer so successfully to Queensland. For most of Grenning's term as Conservator, Trist was Silviculturist and Deputy Conservator, the head of silvicultural research for most of the period after his graduation from the Australian Forestry School in 1933 being C. Haley. Trist succeeded Grenning in 1964, Haley in turn succeeding him as Conservator in 1970. Haley retired in 1974 and was followed by W. Bryan, a post-war graduate whose course at the Forestry School had been interrupted by service with the RAAF during World War II, and who had had considerable experience as a District Forester in various parts of the state and had headed various technical and administrative divisions in the head office.

During the 1930s, the Department began the practice of issuing circulars from head office to its field officers outlining the procedures to be followed in various silvicultural operations associated with seed collecting, nurseries, site preparation, planting, fertilising, tending, pruning, thinning, tree-marking, regeneration, and the like, for both the native forest and conifer plantations. The circulars formed, at one and the same time, both prescriptions and instructions. They were compiled by senior officers in appropriate specialist positions in head office as a synthesis of as much knowledge as was available on each topic at the time and in terms of the pertinent objectives of management. As new knowledge was obtained by observation, experi-

ence, experimentation and research, locally and overseas, so the prescriptions were suitably amended, old circulars withdrawn and new circulars issued.

For a new service, with limited knowledge of the silvical habits of the species of its natural resource and those it had chosen for its man-made forests, but which was eager to get on with ambitious programs, such an 'automatic' style of technical administration had obvious advantages. The prescriptions were compiled by people best fitted to compile them, in the best position to have the most up-to-date knowledge of the topic, and in the best position to be aware of the effects of the latest technological, industrial and market developments on the particular objects of management and on the ways of achieving them. A field officer could get on with the 'doing' without having to spend time working out what he should do. Research was centrally located and directed, and duplication of research avoided. As written instructions, the prescriptions were unequivocal, able to be readily interpreted and implemented, and easily monitored.

In practice, there were some disadvantages. As they were designed for universal application, at least in the first instance, local variations often made for difficulties in implementing the prescriptions or led to poor results. In particular, the procedure tended to discourage any creative thinking on the part of the field staff and decreased their professional motivation, particularly as the intentions behind the prescription, the thesis on which it was based and the evidence to support that thesis, or the reasons for a change from one prescription to another, were frequently not included. Such a procedure of 'managing by rules' is a standard topic in any study of organisation theory, especially its application to technical administration in an organisation such as a forest service. Depending on the particular organisation, its goals and the people in it, the balance of the advantages and disadvantages may tip one way or the other considerably. As a result, its application and effects in Queensland have been of interest to the profession, especially in contrast with some other states, which have adopted a much more democratic or laissez-faire attitude to the evolution of silvicultural practice. In recent years in Queensland more local variations have been taken into account, and more involvement of the professional field foresters sought, in the compilation of the prescriptions.

The Native Forest

Jolly's first report dealt at length with the needs and problems of the eucalypt forests of the coast and the rain forest of the Atherton Tableland. Two things demanded immediate attention. One was yield regulation. It was apparent that many forests were being overcut. The only control on cutting was restriction to a minimum girth, and on the

more productive sites this limit was too low. Although the information then available on tree age and size distribution, and on relative growth rates, was quite inadequate for the firm determination of a permissible cut, at least the yield could be prescribed on an area basis as the first step toward effective yield regulation. However elementary a method, it was better for the forest than 'sawmiller selection'.

The other need was for the reforestation of cut-over areas. To keep costs to a minimum, this should be by natural regeneration. This was not something that would happen of its own accord, as many people thought, but would require skilful silviculture; and Jolly set about carrying out whatever improvement operations seemed sensible from field observations and were feasible with the limited staff, meanwhile establishing experiments, in north and south Queensland and on Fraser Island, to find out just what that silviculture should be. Swain continued and expanded these experiments with emphasis on the means of obtaining natural regeneration of desirable species, and by the 1920s had extended them to cypress pine in the south-west.

The major problem was restricted utilisation, one of the reasons why he continually pushed the great range of available species to an indifferent market that had grown up on a continuous diet of some of the best soft and hard timbers in the world. The selective logging took the best trees of a limited number of desirable species and left the forest in no state for their regeneration. Experimental work on the eucalypt forests of Fraser Island suggested standard operations should follow a sequence of (i) ringbarking of all undesirable species in the autumn some years previous to logging; (ii) logging, during a period of about six years, of all timber which could be removed profitably irrespective of girth; (iii) a regeneration burn; (iv) ringbarking of seed trees to stimulate seed fall; and (v) brushing of competing growth and filling of blanks with tubed seedlings. Large areas were treated by this schedule during the years of the economic depression with Unemployment Relief Scheme funds and, since the success of this treatment was wholly dependent on its protection from fire, many kilometres of fireline were constructed around and through it. By 1934, more than 40,000 ha had been treated; and this was duplicated in the next three years, most of it within the 'protected' zone.

The most important step in the utilisation and reforestation of the eucalypt forest was taken in 1937–38 with the introduction of 'economic tree marking'. Previously, the arrangement was for a sawmiller to be granted 'rights' to an area and, though rangers marked the trees which could and should be felled, the cutters took of those only the ones which they felt confident would be utilised and so would return them recompense for their labour. Inevitably the ranger would have to bring the cutter back to an area to fell trees that had been marked but not felled. Disputes over whether trees would

prove utilisable or not when felled would follow, and frequently trees felled at the ranger's insistence would prove commercially useless, to the cutter's expense. The Department was trying to combine silvicultural treatment with utilisation, but the 'creaming' that was taking place was a combination of inefficient utilisation and ineffective silviculture. Under the new system, the cutter felled everything that was marked and was guaranteed a minimum allowance on trees that turned out to be defective ('duds'), which was met by the miller and the Department. Much of the credit for the system, and the prescriptions by which it was implemented, was due to S. Menadue, who, as a field forester, devoted much of his life to the silviculture of the south-eastern eucalypts; to N. Allom, who, as an Inspector, handled the administrative side of the system with dedicated energy; and to A. H. Crane (subsequently Chief Commissioner in Tasmania), who, as Senior Forester, organised the mill-scale studies to provide the information necessary to determine which trees should be marked for felling and which logs from them could reasonably, on economic grounds, be nominated as 'compulsory' and which logs should be classified as 'optional' or 'duds'.

The system had three main aims — to secure maximum utilisation of the stand; to ensure the stand was marked to silvicultural advantage; and to ensure that, when it was cut over, follow-up treatment would be effective. The main objective was the progressive development of stands towards higher and higher quality. For upwards of thirty years, this system was applied with considerable improvement in utilisation and in the silvical response of the forest, by which time information on growth rates and the response of trees to treatment, which had accumulated from experiments and management inventory, showed that the prescriptions should be modified to take more account of individual tree characteristics and qualities.

The tropical rain forest is confined to the coastal plains, the foothills and the coastal ranges between Cooktown and Townsville. Originally it may have covered an area of more than a million hectares. It was a prime target for the cedar hunters of the 1870s and following them, as in the rain forests of New South Wales, the settlers. Something like 40 per cent of it has been alienated or leased for settlement of various kinds. Although the clearing for this settlement involved an enormous waste of wood, it also established a plywood market in the south for cabinet species like walnut, maple, silkwood, silky oak and kauri pine and a general utility timber market in North Queensland.

To perpetuate wood supplies of these kinds from the 400,000 ha since reserved as state forest is a major problem set by the forest itself, for characteristically, it is composed of a great many tree species. A few of these are highly sought after as cabinet woods, a larger number are useful or potentially useful for general purposes,

and an even larger number have no particular qualities to make them commercial at present or have qualities which militate against their use. Selective logging of the cabinet species is inefficient utilisation. It also does not provide suitable conditions for their regeneration, and artificial re-establishment is difficult or impossible for ecological reasons or is prohibitively expensive. But, while the cabinet species find a ready demand as plywood in the south or in other states, despite their distance from those markets over a very expensive transport system, the general utility species face strong competition there, especially as they may be available only in relatively small quantities at any one time and may require special utilisation techniques. There is, therefore, a general reluctance on the part of industry to carry out the comprehensive utilisation which is the natural objective of management, from the viewpoint of rational use of the resource, and is also essential for its effective regeneration. To ensure wider and more consistent utilisation, the Department introduced compulsory logging of certain species (of the order of a hundred) in 1946.[44] In the same year, a program of silvicultural treatment was begun, which has been modified several times since but is aimed, after tree-marking and subsequent logging of a selective nature, at artificial reduction of the stand to favour species according to their relative growth habits and wood values, supported by underplanting of the more desirable species where regeneration is inadequate. The amount of treatment carried out has progressively declined, however, in recent years.

The value of cypress pine, which occurred in scattered areas west of the Dividing Range in the south-east of the state, was recognised from the days of early settlement. Usually mixed with various eucalypts and acacias which generally do not provide logs of sawmilling quality, it is a small straight tree of typical conifer habit with a wood that, unlike the other species with which it is associated, is resistant to the termites which are also a feature of the region. It thus became a popular general building timber for local use and remained so until the late 1940s, when it became popular for flooring on the Sydney market. In recent years its special qualities have made it popular in the mining areas of central Queensland and in Darwin. The total area over which it occurs is probably something in excess of 1.5 million ha, of which about 800,000 ha is state forest and only about a third of that worth silvicultural treatment on present standards, mainly the removal of unwanted species by felling or the use of weedicides, and thinning of the cypress. The region has the most severe fire climate in the state and every effort is made to protect the forest from wildfire.

The other major use of the cypress pine region is cattle grazing. In 1957, the government passed legislation to allow, in the case of certain grazing leases, the lessees to convert them to freehold by payment of land and forest valuations over an interest-free period

except where the Forestry Department could claim a 'public need' of the forest. The Department expressed concern at the likely destruction on a large scale of young and advanced cypress pine and eucalypts under this scheme, as any control the Department had on the forest under leasehold conditions would be lost on conversion to freehold. But, at least as the crown valuing authority for the forests, it had the opportunity to press the public need before the Land Court if any particular resource warranted it.

Applications began to trickle in at first and the Department was able to cope with the appropriate field investigations, valuations and appearances before the Land Court without great disruption to other duties of the survey staff, but eventually it became a major undertaking and survey crews and office staff were diverted from resource and management inventories that were badly needed to establish sustainable yields from the state forests. Within ten years the total area of applications was more than 8 million ha, and twenty years after the commencement of the scheme, the Department had processed between three and four thousand applications covering a total of 12 million ha, something of the order of 40,000 ha of state forest reservation having been negotiated with lessees over that period.

In 1973–74, amendments were made to both the Lands Act and the Forestry Act to provide for the creation of 'Forest Entitlement Areas' (over and above the procedure for the acquisition of areas of the grazing leases for state forests) through the retention by the Crown of small areas of good quality forest for timber production within the freehold tenure, with a provision for the lessee and the Department to agree on the management of the forest area and for the lessee to share in the proceeds from timber sales from it.[45] The scheme had obvious benefit to the Crown, the lessee and the sawmilling industry. There has not been a marked response to the proposal to date.

Coniferous Afforestation

The people of Queensland could be pardoned for having been profligate with their forest resource. The state had been blessed with what must have seemed in the early days of settlement an unlimited supply of some of the finest cabinet woods in the world (cedar, maple, walnut and silky oak), a group of the best general utility coniferous timbers in the world (hoop, bunya and kauri pine), and a great range of constructional hardwoods. But each head of the Forest Service, from MacMahon onwards, had pointed out that the resource was limited, that careful husbandry was necessary and that thought should be given to its replacement, particularly as it was clear that, in the severe competition for the more productive land on which the cabinet woods and the native conifers grew, forestry would almost inevitably rank behind other demands in the land-use priority list and that replacement of the resource would have to be made on the less productive land.

Jolly had started experimental raising of native and exotic conifers in nurseries and field trials of them before World War I. With forest reserves being diverted to settlement as the advancing railways made the land more accessible, and with timber prices rising as supply had to be sought further from markets, he had his eye on the 'waste lands of the coast' for afforestation; but the results that might be achieved there needed a lot of experimentation in view of 'the difficulties of climate and drainage'.[46]

As the new Director, Swain continued the experimental planting which Jolly had started on the Atherton Tableland, on Fraser Island and in the Mary Valley, though his reports on the subject of afforestation carried some rather chauvinistic overtones:

> while the outstanding fact of Australian silviculture in the past has been the phenomenal planting success in the southern states of the introduced Californian *Pinus insignis (radiata)*, the achievement of the Queensland experiments is a comparative triumph of the Australian species and the virtual rout of the exotics; ... the hoop pine of Queensland ... has thriven under conditions which would kill *Pinus insignis* to a plant ...

He agreed with Wilson, a recent visitor from the Arnold Arboretum (USA), who did not know of any country 'that has as fine a range of trees as Queensland'; and, under those circumstances:

> with such a generous abundance of forest ingredients, the search for suitable species need scarcely be extended beyond our own borders. ... Ultimately great artificial forests of *Pinus insignis* and other cheap coniferous softwoods will make their appearance in southern Australia ... but for the most part the forest policy of this State will resolve itself into the provision for Australia as a whole of cabinet timbers and high-grade native pine woods, plus a quota of constructional hardwoods for local and export purposes. The responsibility of the Forest Service is to make the best possible use of the native species.[47]

Five years later, however, he had softened his attitude towards exotics a little. In 1926, he published a comprehensive summary of the wood-supply situation in the state and suggested solutions to likely future problems.[48] The main problem was the diminishing supply of hoop and bunya pine. The options were to keep up the present rate of cutting, in which case it would be finished in twelve years, or to ration the cut over a longer period while phasing in what would be an increasing supply from plantations. He favoured the latter course. He saw the annual need of 'every man, woman and child in Queensland [as] a minimum timber ration sandwich of a hundred superficial feet of sawn softwood and a hundred superficial feet of sawn hardwood, with an ample cabinet-wood filling in between' and believed that

there would be '3,000,000 mouths to feed with the Queensland wood sandwich by the time the new hoop pine groves are ripening for the sawmills fifty or sixty years from now'. At that stage there were 500 ha of coniferous plantation. The target was an annual 2000 ha. Where should they be located? Three-quarters of the state population was in the south and a half of that in Brisbane; this market obviously demanded first consideration. The Forestry Board had obtained 6000 ha of waste land in the vicinity of Beerwah, where the experimental station had been established in 1924. The Board would favour there the Southern (USA) pines, which had been shown to be successful, meanwhile continuing with hoop pine in the rainforest soils of the Mary and Brisbane River valleys, which favoured that species.

So there gradually developed the basis of a policy of afforestation and reforestation that the Forest Service was to follow from then on. Hoop pine was a highly favoured wood and should be grown where possible. There were silvicultural and economic problems with natural regeneration so it was argued that the native rain forest areas should be cleared after their millable contents had been logged and that they should then be planted to pure hoop pine, for which satisfactory nursery and planting techniques had been established. Bunya and kauri pines were not satisfactory in this regard. Because there would not be enough land suitable to reforestation with hoop pine to meet future needs, because rotations of at least 60–80 years could be anticipated, and because the plantations would be about 170 km from the main market of Brisbane, further planting of faster-growing species closer to Brisbane would be needed. The Southern pines on the coastal lowlands about 80 km from the capital were the answer. The management objective would be the same for both the native and the exotic conifers — namely, to grow as much high-quality wood as possible — since the market had been used to it, would continue to demand it, and would continue to pay more for it than lower-grade wood. This objective came to be crystallised in the phrase 'the production of the maximum quantity of high-quality wood in the shortest possible time with minimum sacrifice of volume production'. The Service then set about developing silvicultural procedures to achieve this objective.

One obvious requirement was the best possible stock. Seed for hoop pine was collected from trees of superior form and vigour during the logging of native stands up to about 1953, when it began to be collected from superior trees in the plantations as well. The first batches of seed of the Southern pines were obtained from high-quality stands in central Florida, which had a climate similar to that of south-eastern Queensland. From about 1936, seed was gathered from the early trials and plantations which had resulted from this imported seed. In the late 1930s and early 1940s, the Service began a pioneering program in tree breeding, of both the native and exotic species,

establishing its first seed orchard in 1954 using slash pine. The considerable gains from this program over the next thirty years have been documented in numerous papers on the subject. Most of the seed for both hoop and exotic pine plantation establishment is now obtained from seed orchards.

The other obvious requirement was the development of appropriate silvicultural schedules. It was thought that the objective would be obtained by fairly wide initial espacement of the seedlings, high-level pruning of trees selected as early as possible to form the final crop, and thinning aimed at concentrating the maximum growth on those final-crop trees. They would provide the quality wood for ply and joinery, the thinnings providing utility building and case material. An extensive research program was started, the early experiments being based on work on similar species with similar aims by I. J. Craib and A. J. O'Connor in South Africa. As research provided information about the responses and growth habits of the various species under a range of natural and manipulated conditions, and as the tree-breeding program provided continually improving planting stock, so the various planting, thinning, pruning and harvesting schedules were modified to meet the objective most efficiently. With time, too, changes in market requirements, in technology and in industry influenced the objective itself so that, by the 1960s, the emphasis on the production of high-quality timber had settled on hoop pine, with the exotics providing structural grade timber, industrial plywood, case material, particle board and pulp.

Like all the other afforestation projects in Australia on inferior sites, the exotic conifer program had its problems. In the early 1930s, trees on certain sites in the Beerwah area showed a shortening or fusing of the needles, thinning of the crown, reduced growth, stunting and, frequently, death. The 1934 annual report commented, 'it is hoped that the fused needle disease now attacking some of the trees will not become epidemic in proportion.' At this stage it was thought that the disorder of radiata pine in South Australia was caused by a fungus and that this 'fused needle disease' was likely to be of similar cause. The recently appointed pathologist, H. E. Young, was directed to investigate it, and by 1940 he had amassed considerable evidence to support the view that the disease was the result of insufficient phosphate in the soil and could be corrected by the application of phosphatic fertilisers.[49] Surveys to determine the varying phosphate contents of the soils, and subsequent addition of appropriate corrective amounts of fertiliser, then became routine. In the mid-1950s, for various reasons, loblolly pine was practically dropped from the program in favour of slash pine. Research in the 1960s extended the type of site on which economically successful planting could be carried out,[50] particularly by draining and mounding, techniques which

foresters of the late 1940s had proposed but which had to await the later development of appropriate machinery.

In 1926, Swain had seen about 70,000 ha of ecologically and economically suitable planting land within about 300 km of Brisbane, all of which he regarded as a future target. By the 1950s, the target had been raised to 80,000 ha. By the 1970s, it had been raised to 240,000 ha, of which about 80,000 ha would be hoop pine, and 160,000 ha of exotic pines (120,000 government and 40,000 private). At the end of the 1970s, government planting totalled 120,000 ha, one-third hoop pine and two-thirds exotic pines, the annual planting rate being of the order 4000–7000 ha. More than half of this total was planted during the period of the Softwood Forestry Agreements. At first the planting of exotics was confined to the Beerwah area but, in 1948, planting commenced in the coastal area stretching from Maryborough to Gympie and shortly afterwards in the Yeppoon area east of Rockhampton. The first trials of Caribbean pine (*P. caribaea*) were made at Beerwah in 1948 and were sufficiently promising for this species to be favoured in the Rockhampton area and in north Queensland when planting started there.

The early intentions were that pine planting would be so designed as to support local industry in a number of separate localities. By the 1970s, planning direction had changed to the encouragement of large, integrated industrial plants on a few large areas.

The Timber Industry

In 1933, the government took steps to discontinue the operations of the state sawmills for which the Forest Service had become responsible in 1920. They had been both a blessing and a bane to the Service. They had given Swain the opportunity to demonstrate the uses of a wide range of the state's timbers which the trade and public preferred to ignore: 'we have selected from our own forests only the finest products and have applied them to the basest purposes'.[51] The mills had also allowed the Service to obtain information on rates of recovery and production costs which were not otherwise available to it but were essential to the assessment of stumpage on the basis of the residual system. In the Forest Engineer's opinion 'the Forest Service sawmilling organisation can be made a powerful weapon in controlling the timber industry of the State'.[52] But, for this reason, of course, the government mills were hardly popular with industry, some sections of which made continual attempts, informal as well formal, to persuade the government to get rid of them. They were also inefficient in many ways, both in plant and location. From the time the Forest Service took them over, they ran at a profit practically every year until the economic depression. Then, losses for three years in a row, plus a report that the mills were in a condition where continual losses could be expected, were justification for their sale.

The recession in the building industry in the period of the economic depression brought home to the sawmilling industry the need for a combined effort with government at its own rehabilitation and in May 1931 the Minister for Lands convened a large conference of representatives of the sawmilling and associated industries to consider the matter. Arising out of this, a Timber Industry Advisory Committee of wide membership was appointed in 1932 to inquire into all aspects of the trade and to confer with the Forestry Board. One of its earliest recommendations was that, as a measure of control, all sawmills should be licensed, and in 1936 the government legislated for this in a Sawmills Licensing Act to be administered by the Forestry Board on the advice of the Timber Advisory Committee.[53] This practice of licensing sawmills continues to operate. The applications for licences which followed the legislation led to the first complete census of the industry and to the first comprehensive information on its structure and distribution, and provided a better opportunity for liaison between the Department and the industry.

As in the other states, the activities of the Department and the operations of industry were directed primarily to war needs by Timber Control from late 1939 until the end of 1945. Before the war, Queensland had been meeting not only its own demand for softwood but also some of the demand of some of the other states. As the resource dwindled, consideration was given at various times to reducing the annual cut and favouring only its own needs. With the outbreak of war, not only was this action postponed but efforts were made to increase the supply to other states to meet the deficiencies caused by the restriction of traditional imports. Despite reduced manpower and plant, more timber was logged and processed than in any other six-year period. Industry conditions were particularly difficult in Queensland. It was well removed from the traditional sources of engineering plant in the southern states, closest to war operations and heavily dependent on the single railway line 1600 km long from Brisbane to Cairns as its main source of communication within the state and for the transport of men and materials to the war zone.

In March 1946, to assist in meeting the increased post-war demand for timber, people who had access to privately owned forest stands and were prepared to produce sawn material at an early date were granted sawmilling licences.[54] However, problems developed, particularly when a number of people claimed access to the same stands, and the policy was discontinued in 1951–52.[55] From then on, more consideration was to be given to the timber requirements of the community and to the life of the industry relative to the growth rates of the forests. At the time, the number of licences greatly exceeded the capacity of the forests to support them. The efficiency of the legislation was kept under constant review and proposals for modifying it, and the

methods of its implementation, were forwarded to the government at various times. In November 1958, a Timber Inquiry Committee was appointed to investigate the timber sales and sawmill licensing policies of the Department.

One result of its report of August 1959 was the establishment of a Sawmills Licensing Board to consider all questions of licensing and to make recommendations to the Director of Forests.[56] Eventually, in April 1965, substantial amendments were made to the Act, particularly with regard to the assessment and control of mill capacity and the equating of licensed capacity and log supply. In 1969, a fairly radical change in policy took place. Amalgamation of sawmills within specified zones was permitted, and was encouraged in order to utilise the available log supplies more effectively through fewer and more economic processing units.

The sapwood of a number of Queensland timbers is susceptible to attack by *Lyctus* spp. (the powder post borer). This has been known for a long time and investigative work on methods of seasoning and preserving sawn timber against the attack of the borer began in the early days of the Forest Products Research Branch of the Service. The increased demand for building timber in the early post-war period brought with it increased complaints from the building industry, finance companies and home-owners about the use of susceptible building timber and, following the successful introduction of legislation in New South Wales to control the use of timber susceptible to *Lyctus*, the Department was instrumental in having the Timber Users' Protection Act 1949 passed to protect timber users against the indiscriminate sale and use of *Lyctus*-susceptible timber which had not been adequately seasoned and treated. Amendments to this Act were made in 1955, 1964 and 1965.

National Parks

The national park movement in Queensland had its genesis in R. M. Collins, who as a child moved with his parents from Sydney to the McPherson Ranges in the south-east of the state in 1844. As a young man on a world tour, he became impressed with the national park ideals which were then being generated in the United States and, on his return to Queensland, having become a member of the Legislative Assembly, he began pressing for similar reservations in the McPherson Ranges.[57] In 1906, largely as a result of his efforts and the support of the then Minister for Lands, an 'Act to Provide for the Reservation, Management and Protection of State Forests and National Parks' was passed, making the recently established Forestry Branch of the Lands Department responsible for the reservation and administration of national parks as well as state forests.

Reservation of national parks began in 1908. The first was Witches Falls, about 130 ha on Tamborine Mountain, which was set apart after

representations by the shire council because of its 'picturesque ruggedness, the presence of waterfalls and vast quantities of palms and tree-ferns, and the desirableness, in view of the rapid denudation of the mountain of timber, of providing protection for the native flora and fauna'. Another was an area of about 9000 ha in the Bunya Mountains, which G. L. Board, as Inspector of Forests, recommended for reservation in 1903 because of its special values as well as large quantities of commercial timber. The third was about 50 ha in the parish of Killarney with a 'deep gorge and permanent waterfalls'. The fourth was about 90 ha near Rockhampton, 'known for over thirty years as the Fairy Bower Recreation Reserve . . . of dense vine scrub with rich soil and much used by the residents of Rockhampton as a picnic ground'.[58]

From then on, in an active program of reservation, the number of national parks continually increased under every head of the Forest Service. Collins was unfortunately not to see the dedication of Lamington National Park in 1915,[59] an area of about 20,000 ha south of Brisbane adjoining New South Wales and now one of the best known national parks in Australia. Disputes over the need for such a park, and arguments over its size and boundaries, delayed its reservation until after his death in 1913, but the torch he lit was ably taken up by the equally enthusiastic and dedicated Romeo Lahey, who, as a son of a sawmilling family in the region, began taking an interest in the border area in 1908 and began an intensive campaign for its reservation. He became President of the National Parks Association of Queensland when it was formed in 1930 and was instrumental in securing the dedication of other parks, particularly one in the Daintree River region in north Queensland in 1962,[60] which was to become known as the Daintree River National Park and was eventually increased to more than 50,000 ha, at that time the largest park wholly within the state.

The first provision in the budget specifically for national parks — a sum of £2,000 — was made in 1936. Half of this went in salaries and expenses of the park rangers, but some of it was spent in the Lamington Park on the first of what was to become many hundreds of kilometres of pathways constructed solely for pedestrian use and designed to fit unobtrusively into the landscape to 'afford the opportunity for untroubled observation at close quarters of the scenic beauties of the Park . . . [with] fatigue reduced to a minimum '.[61] The policy, which has never changed, was to preserve the parks in their original condition as far as possible. The tracks were the only form of disturbance. Not only were they designed primarily for the use of visitors, but visitors were strongly discouraged from moving off them. The only other form of management was protection from fire. By the end of 1936, total reservation was approaching 200,000 ha and included islands of the Great Barrier Reef.

The policy of preserving 'unspoiled and intact' these 'fragments of Australian bushland' and protecting 'its denizens'[62] came under continual, strong attack from the timber industry, which saw more and more valuable commercial forest locked up against utilisation, and strong pressure for the Service to relent on this policy was applied during World War II because of the special circumstances of those years. The Director, however, refused to concede and, in his annual reports, firmly expressed his views. He was fortunate to have the dedicated support of C. J. Trist, Secretary of the Department, who was in charge of the administration of the parks and worked untiringly for their cause for over twenty years. In Trist's successor, W. Wilkes, the park system found an equally zealous crusader and administrator, as it did in A. R. Trist, who was variously Deputy Conservator and Conservator from 1947 to 1969.

The Forestry Act of 1959 (which became operative in August 1960) clearly spelt out the cardinal principle to be observed in the management of national parks as 'the permanent preservation, to the greatest possible extent, of their natural condition and the Conservator of Forests shall exercise his powers . . . in such manner as appears to him most appropriate to achieve this objective'. By 1964, there were about 250 parks, with a total area exceeding 400,000 ha. The creation of the Simpson Desert National Park, in cooperation with South Australia, in 1967 more than doubled this total. By this time it had become clear that certain parts of the parks warranted special protection and management, and an amendment to the Forestry Act in 1968 provided for the declaration of a part or the whole of a park as a primitive area, recreation area, primitive and recreation area, a scientific area or an historic area, by the Governor-in-Council on the recommendation of the Conservator. Specific prescriptions regarding such areas were spelled out in the legislation. In 1971, further legislation was enacted making provision for the reservation of 'Marine National Parks' within marine park areas and for funds to enable the investigation of areas for such reservation. The first of these, at Green Island and Heron Island, were declared in 1974.[63]

From the mid-1960s, emphasis began to be shifted from reservation for scenic value, which had been the original criterion, to reservation of samples of the main environments, including the less scenic. It was recognised that there was a great range of natural environments in the state, extending as it did over a latitudinal range of about twenty degrees, and that the rate of development of the state lent urgency to the securing of areas to preserve as complete a sample as possible of the major landforms, the vegetation and fauna habitats. More staff were recruited and the cooperation of other government instrumentalities involved in land use was sought to survey appropriate areas and to plan their management. Particular attention was given to the coastal wallum of Southern Queensland, the wet tropical lowlands of

north Queensland, the brigalow scrub of western Queensland, and rain forest habitats which had not already been reserved for their scenic values. The great area of Cape York with its special features came under particular notice.

By the early 1970s, many of the parks were experiencing over-use of the picnic facilities which were a feature of the entrances to them and from which the graded tracks generally radiated. To relieve some of the pressure on these parks and to promote the concept of multiple use of state forests, as well as to provide opportunities for certain kinds of recreation not permitted or available in national parks, from 1971 onwards the Forestry Department received funds specifically for the development of suitable areas for recreation in state forests.

In May 1975, the government passed legislation establishing a National Parks and Wildlife Service as a Sub-Department of the Department of Lands, responsible to the Minister for Lands, Forestry, National Parks and Wildlife. The new Service took over responsibility for the national park provisions of the Forestry Act plus responsibility for a number of other Acts, or provisions of them, relating to conservation and the environment. At the time of this exchange of responsibility, there were more than 300 terrestrial national parks and two marine national parks, with a total area in excess of one million hectares, of which one park was more than 500,000 ha, one more than 50,000 ha, seven more than 20,000 ha, five more than 10,000 ha and forty-four more than 1000 ha. There were 500 km of graded tracks and something like two million visitors a year. It was a considerable achievement in conservation by a forest service in seventy years and, in the next five years, the national park area more than doubled as a result of actions initiated within the former National Parks Branch of the forest service.

Multiple Use

By 1936, with forty-three national parks covering 200,000 ha under his care and government funding for staff to manage them, the Director thought it an opportune time to remind the government in his annual report of the 'indirect values' of the forest, which he suggested might, though it was difficult to assess their worth in monetary terms, even exceed the 'direct and readily assessable values', such as for wood production. He suggested it was necessary to begin to provide other avenues of recreation to complement and supplement the national parks, for, he said, 'Recreation will be one of the main uses of the State Forests of the future.' Although the government may well have been responsive to the spirit of the appeal, it was not forthcoming with funds and the Department was left to pursue its ideas, with whatever money it could spare from the major demands on its financial allowance. Beauty spots, picnic areas, scenic drives and the like were established — in the same area as wood

production if the two uses were compatible or in separate areas if they were not.

By the early 1970s, the Director's forecast of nearly forty years earlier was being realised all too well and the Conservator was expressing concern about the rapidly increasing number of visitors to the national parks and the risk of damage to the habitat and environmental values of the parks. Obviously, other venues of outdoor recreation needed to be developed, and the obvious place was in the state forests. The government responded with a modest increase in funds for this purpose. With the transfer of responsibility of national parks to the new National Parks and Wildlife Service in 1975, the Department began stepping up the establishment of recreation facilities, particularly state forest parks. Special training courses were held for the field foresters, and full-time staff were appointed to coordinate the planning of forest recreation throughout the state. By 1978–79, it was estimated that upwards of 350,000 people were using the developed forest parks annually and as many again were enjoying recreation of various forms in other parts of the state forests not developed specifically for the purpose.

Many state forests serve as water catchments for domestic and industrial water supply, and forest operations on them, particularly harvesting, have always been strictly controlled to avoid adverse effects on water quality. Under the legislation native flora and fauna in state forests are protected. This protection is even more secure on the 2 million ha not commercially loggable.

Grazing has always been regarded as compatible with wood production, but the effective area is limited because the silviculture directed at wood production reduces grass competition as much as possible and litter-reduction burning is aimed at keeping grass as well as forest litter to a minimum. However, grazing is encouraged in open forest types to reduce grass growth and in hoop pine plantations to reduce weed growth. For some years, the Department has been carrying out experimental work on the practical and economic feasibility of agro-forestry in the form of sown pasture in traditionally 'rough grazing' forest types such as spotted gum, and also in young hoop pine plantations.

The honey industry relies heavily on the box and ironbark forest of western Queensland and, in the management of these forests, the Department pays appropriate consideration to the requirements of this industry.

The rate of increase of planting of the coastal lowlands, promoted by the special Commonwealth funding for coniferous afforestation which began in 1966, stimulated urgent consideration of the reservation of representative sites of its major communities as museum samples, as genetic and habitat reservoirs, and for general scientific study. A system for selecting appropriate areas in the lowlands, and

prescribing for their preservation and management, was developed and is gradually being extended to all the important forest types.

Despite the Department's implementation of such multiple use for many years, it had in fact no formal charter for this under its legislation, which only charged it with 'the management of all State Forests ... with the object of maintaining as far as practicable adequate supplies in perpetuity of timber and other forest products therefrom'. In 1976, the Act was amended to make it obligatory for the Conservator to give due consideration to water and soil conservation, environmental protection, grazing and recreation, in the management of state forests for wood production. It was a formal recognition of the Department's multiple-use policy, and formal confirmation of its years of practice, which it had long sought.

Land Use

Roughly 200 km north of Brisbane and 60 km east of Gympie, in south-east Queensland, there lies a coastal area which has come to be referred to by the general name of 'Cooloola'. In recent years it has been the centre of considerable disputation about land use and the Forestry Department has been heavily involved. Its north-eastern boundary is formed by Rainbow Beach, which runs south-east from Inskip Point (opposite the southern end of Fraser Island) to Double Island Point. Its eastern boundary is the coastline stretching roughly south from Double Island Point towards Noosa Heads to the southern end of Lake Cootharaba, which forms a short southern boundary. The north-western boundary is formed by Tin Can Bay (Inlet) which has its outlet to the sea at Inskip Point. The western boundary is somewhat indeterminate but for present purposes of discussion is taken to be the Como Scarp, an escarpment running from Mount Elliott in the north (in the vicinity of Tin Can Bay) to Mount Coondoo in the south (in the vicinity of Lake Cootharaba).

This area is an outstanding complexity of natural features with considerable aesthetic appeal. While the individual features occur in many parts of the eastern Australian coast, they are here aggregated in one small region which, until recently, has been only lightly touched by man, even though it is within reasonable access of the most concentrated population centres in the state. The long beach of the eastern boundary is backed for much of its length by almost vertical cliffs of coloured sand (upwards of 100 m high), the Teewah Coloured Sands, which form a spectacular landmark. Rainbow Beach, flanked on the south by Double Island Point and also backed in places by cliffs of coloured sand, is a particularly attractive beach (even by the high Australian standards). The area to the east of the Noosa River, which roughly bisects the area, is a complex system of parabolic-shaped sand dunes with their long axes in the general direction of the prevailing south-easterly winds. The moist depres-

sions between them carry stands of rain (vine) forest, which merge on the protected slopes through 'bastard scrub' (transitional forest) into eucalypt forest in which blackbutt is the dominant species. The less protected slopes and more exposed dune tops carry a woodland of eucalypts, banksias and cypress pine. The vegetation along the eastern edge, a mixture of grasses, herbs, shrubs and stunted trees typical of the eastern coast, absorbs the full force of the salt-laden south-east trade winds and the occasional tropical cyclone, and forms a critically protective barrier against them for the whole dune system. Because of their shape, their sandy nature and the high rainfall of the area, the dunes form a large water storage area which feeds the Noosa River on its eastern side. There are scattered, small freshwater lakes in the dune area and a series of lakes (variously of fresh, brackish or salt water) to the south, the larger ones of which are fed by the river. Because of its isolated location, the river is unpolluted and forms an important potential source of domestic water. The river and the lakes are important feeding and breeding grounds for fish. Most of the area to the west of the river is typical 'wallum', open plains of reeds, sedges, heath swamps and herbfields, which support a wide and spectacular variety of wildflowers, interspersed with low hills covered with mixed eucalypt species. It is a vast catchment area with a maze of tributaries to the river. There is a limited amount of drainage at the northern end of the area into Tin Can Bay, which is another important feeding and breeding ground for fish.

The history of tenure of the area, and the use of the forests for timber supply, have been outlined in considerable detail by Hawkins.[64] The extension of settlement to Maryborough (to the north) about 1850 and Gympie (to the west) about 1870, was inevitably accompanied by harvesting of the more accessible soft timbers of the rain forests, the readily millable species of the better quality eucalypt forests, and the hard and heavy timbers of the open eucalypt forests of the region for local use and for export to Brisbane and further south. The area east of the Noosa River went through various phases of reservation by the Crown for the control of timber operations and by the late 1920s most of it had become State Forest (No. 451). By that time, there had been spasmodic logging of kauri pine, hoop pine and white beech from the rain forest, and of blackbutt, tallowwood, satinay and red mahogany from the eucalypt forest. From the information of inventories of the forest from the 1940s onwards, yields were prescribed and harvesting of them carried out in terms of the tree-marking procedures which had been introduced in 1938 and the subsequent amendments to them. Going into the 1960s, it was the Forestry Department's intention to manage this forest area for a continuous production of native timber for sawmills of the region without conversion of any of it to plantations of native or exotic

conifers, though small experimental areas of these had been established in the rain forest in 1933 and 1958.

During the 1950s, planning for industrial forestry changed from the concept of numerous small processing units each feeding on a separate forest to large, integrated complexes feeding on large, compact areas. The Department saw the wallum area to the west of the Noosa River as forming, along with Tuan State Forest to the north (where the planting of slash pine had started in the 1940s), such an area. With its reservation as Toolara State Forest (No. 1004), planting of slash pine started there to link up with the Tuan plantations.

In the early 1960s, there was little indication of other commercial interests in, or competition for, Cooloola, east or west of the river. CSIRO had started experimental work near Beerwah in 1948 on converting the wallum to pasture for cattle, and grazing leases slowly increased. Leases to dredge beaches to the south of the area had been taken out for some time, as they had on Fraser Island, but none was particularly active. The tourist industry around Noosa to the south was expanding but not posing much of a demand on the area. However, conservationists were drawing attention to the fact that many of the more attractive areas of wallum wildflowers were gradually disappearing under unrestrained, and often apparently undirected, development along the Sunshine Coast to the south of Cooloola and under the steadily expanding conifer plantation program in the Glasshouse Mountains area. They began pressing the Forestry Department for the dedication of the eastern part of Cooloola as a national park, but, under the security the area had as a state forest, the Department saw no particular urgency about this, especially after 1962, when a fauna reserve of about 4000 ha under the administration of the Department of Primary Industry, was dedicated to the south of Lake Cooloola.

In 1963, applications were made for leases to mine some 4000 ha of the high dune area. This stimulated several conservation bodies to arouse public objection to mining in the area, and after about eighteen months the company involved withdrew its application and was granted instead an authority to prospect over a somewhat larger area. As a result, further applications were made to mine certain parts of the high dune area in 1969. This stimulated further opposition to the granting of the leases from a rapidly increasing number of public and private organisations (including the Queensland Division of the Institute of Foresters of Australia) on the general grounds that sand-mining would have irreparably adverse effects on the outstanding natural qualities of the area, which should be conserved intact. One of the companies involved had been mining low dunes along Inskip Point since 1964 and had established access into Rainbow Beach from the road which had existed for many years from Gympie to the village of Tin Can Bay on the northern side of the inlet. The

company was demonstrating what appeared to be successful revegetation of the low dunes, but those opposing the mining of the sand dunes would not accept this as evidence that the high dunes could be similarly revegetated, let alone reformed and revegetated as they were originally. The pressure for the reservation of the area as a national park now increased considerably and active lobbying of the government was pursued, though there was some disagreement among the park proponents over just where the boundaries of the park should be.

While there was little overt competition to forestry when it began its planning and experimental work on coniferous afforestation, the success of some of the many kinds of agriculture which had been tried on the more fertile soils of the coastal lowlands, and on parts of the infertile wallum itself, allied to the fact that the area was relatively close to Brisbane, had kept its potential for agriculture continuously in people's minds. Research into pastoral development in other parts of the lowlands had been going on for a decade or so when the CSIRO pasture research station was established at Beerwah in 1948. Thus by the end of the 1960s, there was a considerable amount of information available on the technical feasibility of beef production in the area. It remained for the economic possibilities to be considered.

With the development of a favourable market for beef about that time, interest in the wallum for beef production was stimulated and, while conservation and tourist-minded organisations were pressing the government to reject the applications for sand-mining, Widgee Shire Council (the local government authority for the northern part of the area) presented a plan to the government which advocated approval of the mining leases, the dedication of about 4000 ha of the area as a national park, along with improved access to the beaches and the establishment of settlements there, the acquisition of a considerable area of the state forests for pasture development leases and coniferous plantations on the remainder of them. It was a perfectly understandable submission because the town of Gympie, the centre of the shire, was suffering a rapid decline in prosperity, the Forestry Department, a major landholder in the shire, paid no rates and much of its holding would remain idle for many years, and development, which brings income from rates and provides employment, is the life-blood of local government.

The Forestry Department naturally opposed any threat to the reduction in its ultimate target of 80,000–100,000 ha of conifer plantation in a compact block. Having been a major source of support for Gympie and its environs for many years through the native hoop pine and the hoop pine plantations which succeeded it, the Department also asked why local government did not see a more promising future in a large exotic pine plantation complex and long-term integrated processing industries than in what was inevitably a

short-term industry in sand-mining and an economically capricious one in beef.

The applications for the mining leases were heard in the Mining Warden's Court in Gympie in May 1970.[65] The cases for and against sand mining were argued by their proponents, after which recommendations were made to the Minister for Mines. To this stage the Forestry Department had avoided any public presentation of its views on the rights and wrongs of sand-mining in state forests. As a government department it was unwilling to be involved in a public declaration of policy on which the government had as yet offered no lead. In addition, the provisions of the Forestry Act require that, before a mining lease is granted within a state forest, the views of the Conservator must be sought and any conditions he considers appropriate must be imposed. The Department's involvement in the Warden's hearing was therefore restricted to the question of the mining of some vacant crown land which the Department was interested in having dedicated as a national park.[66]

The hearing and the Warden's report to the government was the signal for a massive interest by the media, stimulated by divergent views amongst political organisations and a division of opinion between the parties of the Coalition Government and amongst their members. In August 1970, the government announced that mining would not proceed (against the recommendations of the court),[67] that part of the area would be made a national park, and part retained as state forest. At this, the mining companies announced they would claim appropriate compensation, and local residents, who saw little increased prosperity in the government's proposal, voiced vehement protests (including a car-cavalcade to the city). Political lobbying and involvement increased, and the government delayed formal ratification of its intention until its responsibilities in respect of the mining companies' claims for compensation had been sorted out. The following November, after consideration of numerous compromise plans, the government decided to affirm its earlier decision against mining, in favour of a national park and continued forestry.

Several years then passed in legal attempts by the mining companies to seek redress from the government's decision or to restrain it from gazetting the national park. The boundaries of the park were not announced until early 1974 and it was two more years before they were gazetted. To the disappointment of many conservationists, the park was largely confined to a 'doughnut' shaped area with a core of state forest on the eastern side of the river. They then began to press the case that, since the protection of the Noosa River had been one of the major reasons for the park, the inclusion of the 'western catchment' was essential to its integrity. They also claimed that the establishment of conifer plantations on it, as planned by the Forestry Department, would be detrimental to it and that the loss of this area

from the Toolara State Forest, and the subsequent effect of this on the planned integrated forestry complex, could be readily offset by purchasing suitable freehold land and using public land to the north. As a result, in 1975 the government agreed to defer planting in the western catchment for a period of five years until ecological and hydrological studies being undertaken in the area were completed. However, since these studies were never intended to provide information on the effects of planting pine in the western catchment, the Forestry Department commissioned an independent study. On receiving this report, the government announced that freehold land to the north-west would be purchased for conversion to state forest to allow the declaration of the state forest area in the western catchment as national park.

Immediately to the north of Cooloola lies Fraser Island, its southern tip only a short distance across the mouth of Tin Can Bay from Inskip Point. Some 120 km long (in a north-east south-west direction) and variously 5–25 km in width, it is the largest 'sand island' in the world, being composed almost entirely of loose, siliceous sand. In many ways its natural features are similar to those of Cooloola but on a grander scale and of even greater complexity. So great did their appeal become to many people in the 1970s that what was perceived as a growing threat to them by sand-mining brought the place to international notice as an environmental issue.

Prior to this, Fraser Island was little more than a geographical name to most Australians and, except for relatively few fishermen, local nature-lovers and a small though annually increasing number of tourists, interest in the island was confined mainly to the Forestry Department and to the sawmilling industry in Maryborough, which drew about half its supply of raw material from the island (a dependence which had been established more than a century earlier). The first record of the forests on the island appears to have been made by Andrew Petrie, who was sent by Governor Gipps in 1842 to find out whether the great sand mass, which Cook had sighted in 1770 and Flinders had explored a little in 1802, was a peninsula or an island, and to look for traces of Captain Fraser and the crew of the *Stirling Castle*, which was wrecked there in 1836. Petrie reported the island as similar in many ways to Moreton Island, to the south but 'the timber . . . [is] a great deal superior . . . [and] the cypress pine . . . quite splendid'.[68] But it was another twenty years before the first commercial utilisation began, by which time inquisitive timber-getters had discovered the kauri pine, hoop pine and beech of the rain (vine) forest which grows in the valleys between the sand dunes as on Cooloola, and the blackbutt and tallowwood of the open forest on the dune slopes. At first the logs were floated down the creeks to where they could be assembled and punted to the mainland; later they were snigged to

landings by bullock teams. The advent of steam tramways in 1905 increased the rate of utilisation considerably.[69]

Such a well-known resource was an obvious early choice for reservation under the State Forests and National Parks Act of 1906, and most of the central part of the island had been dedicated as a state forest by 1911, when N. W. Jolly, in his first annual report as Director, nominated it. Its favourable climate and the large area available made it the most suitable locality in south-east Queensland to begin trial plantings of conifers to replace the limited supply of native conifers in the region, which were being cut at a rate that could not be sustained for long.

Jolly visited the island in 1912.[70] From the time of his appointment, he had made the point that much of what looked like an impressive total amount of state forest was made up of areas which had been approved for reservation by the government merely because they were not good for settlement and that in fact they carried little or no productive forest. As far as Jolly was concerned Fraser Island was an excellent example of this. Reputedly of 100,000 ha, the 'scrub' had proved on actual survey to be only about 20,000 ha and his cursory examination of it suggested that the heavily timbered area of scrub would be even less. If there had been a lot of kauri pine, as was legend, there was little of it now, and, except for a few pockets, there were few tallowwood trees left after years of logging. Present operations were concentrated on blackbutt, while satinay and brush box, which comprised the bulk of the timber, were ignored. The only regeneration seemed to be those of the latter species and experiments were needed to look into the regeneration of the others. He reiterated his view that the island could become a source of future supply of softwood from exotic conifer plantations not only for Queensland but for the rest of Australia.

From then onwards, for many years, the island featured prominently in annual reports. Harvesting continued, though industry persisted in ignoring brush box and turpentine (except for interstate and overseas orders for wharfing piles); regeneration treatment of the eucalypt forest, and planting of the poorly stocked areas with a wide range of species, was carried out with similar underplanting of the cypress pine forest; there was a program of plantation establishment of eucalypts, rain forest species, and native and exotic pines, which totalled more than 400 ha by 1924. It was, by any measure, one of the most important 'working plan areas' of the state. By 1930, however, the enrichment planting was being curtailed in favour of more extensive treatment for natural regeneration and gradually during the 1930s, with the great expansion of interest and operations in other parts of the state, its prominence in the reports diminished. But it continued its role as a major source of wood for the mills at Maryborough, which had by then very little in the way of timber of

such sawing quality elsewhere in the locality, and the experimental program into the silviculture of the eucalypt forest was stepped up.

Given the importance of Fraser Island in its affairs of the 1920s, it was natural that the Department should seek to increase the area of reservation there, and in 1925[71] it obtained the northern and southern portions, thus making the whole island, in effect, a state forest. During the 1960s, excisions of the order of 10,000 ha were gazetted for township development and other public purposes. It was also natural, given the 'wilderness' qualities of the place, that national park enthusiasts (and foresters themselves) pressed at various times for reservations for that purpose. For some time the Department's response was limited to the designation of some twenty-three beauty spots, totalling about 3000 ha,[72] but in December 1971, shortly after a recommendation from the Coordinator-General's Department for the creation of a national park of about 40,000 ha, the Forestry Department (administrating national parks at the time) announced the gazettal of some 25,000 ha of the northern end of the island as a national park, which it hoped ultimately would be extended to the 40,000 ha recommended.[73] Two years later, the park was enlarged by about 9000 ha.[74] At that stage, the area remaining as state forest was about 120,000 ha, with a prescribed cut of the order of 21,000–22,000 cubic metres per year.[75]

Like Cooloola, some areas of Fraser Island carry heavy minerals and, from 1949, applications for leases to mine the sands for these minerals in various parts of the island began to be made by mining companies. The government approved some of them but active mining, at least to any extent, did not begin on any of the leases until 1971.[76] By that time, the Queensland Government had decided against sand-mining on Cooloola and the mining operations on Fraser Island formed the obvious next target for conservation interests, who began to campaign vigorously to have them stopped there too.

In December 1974, the Commonwealth Government passed its Environment Protection (Impact of Proposals) Act 'to make provision for protection of the environment in relation to projects and decisions of, or under the control of, the Australian Government, and for related purposes'. Although the Commonwealth Government had no control over the mining of heavy minerals on Fraser Island, it did have control over the issue of export licences. Without an export licence, sand-mining on the island had little point since the major markets were overseas. The Act therefore provided a very convenient and important potential ally for the people opposed to sand-mining. They enlisted its aid in their campaign by pressuring the Prime Minister, as Minister for the Environment, to set up an inquiry to achieve the object of the Act:

> to ensure, to the greatest extent that is practicable, that matters affecting the environment to a significant extent are fully examined

> and taken into account in and in relation to . . . [in this case] . . . the making of decisions by or on behalf of the Australian Government in relation to the exportation from Australia of minerals . . . from Fraser Island . . .

An environmental inquiry began in July 1975. As the list of submissions (600–700) showed, it was a long-awaited and eagerly grasped opportunity for a great many people and organisations to say something about sand-mining and any other environmental or conservation issue that could be made to appear even remotely related to it.

The commission presented its final report in October 1976. It recommended that export of minerals from the island be prohibited (except for those extracted from one particular location), and that appropriate economic and other assistance be provided to counter any adverse economic effects that might flow from this recommendation.[77] The Commonwealth Government accepted this recommendation and withdrew export licences in respect of the island in December 1976.

As it was at pains to point out in its report, the commission did not see its task as inquiring into the past or present role of forestry on the island nor as making any recommendations about the future of forestry except to the extent that sand-mining would affect forestry as one of the 'environmental aspects'. The commission's view was that mining of the existing leases, and those for which applications had been made, was unlikely to have much effect on sustained yield logging operations; but any extension of these might in time be a source of conflict. However, given that prior to 1975 the Forestry Department had been the sole or major tenure holder and had exercised the role of administrator of the island, and given that wood harvesting had been the major activity on the island for a hundred years, it was almost inevitable that the commission would feel drawn to make some comment over and above the reference to the 'environmental aspects' — and it did so. It was, it said, 'impressed both by the responsible attitude to Fraser Island' which had been adopted over the years by the Forestry Department and by its 'harmonious working relationship' with the sawmilling industry in Maryborough. It noted favourably that there seemed no lack of understanding of, or support for, the Department's strict controls on the activities of the logging contractors. Its view was that, in general, the 'visual integrity' of the island had not been adversely affected by the 'carefully controlled logging operations' and that only professional visitors (such as 'botanists, ecologists or foresters') would be aware that the timber resources had in fact been exploited for over a hundred years. It did note, however, that some current practices 'such as clear-felling, chemical treatments in thinning . . . burning off' might, if continued, mar that visual integrity.

Although forestry was not 'on trial', it was an opportunity for those people completely opposed to wood harvesting on the island to argue that the Commonwealth Government's interest in the matter of mining could well be served by encouraging the Queensland Government to designate the whole island as a national park. Under the legislation relating to national parks, this would have the effect of prohibiting mining. It would also have the effect of prohibiting logging. Some submissions argued for continuation of the present prescribed yield, but from a restricted area; some argued for the gradual phasing out of logging over a reasonable time. Even those arguing for continuation of logging also argued for an extension of the national park boundaries — as did the mining interests themselves. There was certainly considerable appeal in the idea of some or all of the island being linked for this sort of purpose with the Cooloola National Park. In view of its terms of reference, the commission could do no more than commend consideration of an extension of the park to the appropriate authorities. It could and did, however, recommend that 'the whole of Fraser Island be recorded as part of the National Estate as soon as possible'.

CHAPTER 4

Western Australia

First Settlement

Nearly forty years after establishing a settlement on the east coast of Australia, the British Government decided something should be done about the west coast. Although the government had formally annexed only the eastern half of the continent, it hoped other nations would accept the western boundary of New South Wales (the 129th meridian) as 'being merely ideal and intended only with a view to distinguishing the more settled part of the country'. Colonisation of any part of New Holland by any other country would have been considered an unjustifiable intrusion 'since the whole of New Holland [was] considered subject to His Britannic Majesty's Government'.[1] Nevertheless, the government felt that the French might not accept this view, and in 1826 Secretary Bathurst instructed Governor Darling to investigate the possibilities of establishing a settlement on the west coast of the continent primarily for penal purposes.[2] As a result, a party from Sydney under Major Lockyer established the settlement of Frederickstown at King George Sound in 1826.

Having been informed that the settlement which had been established some time previously at Melville Island (north of Darwin) was unlikely to be successful, Bathurst directed Darling to send a naval vessel there with orders to the captain to relocate the settlement in a more suitable place on the coast eastwards.[3] This task was entrusted to Captain Stirling (at the time a naval visitor to Sydney), who, pointing out the difficulties of shifting the settlement in the monsoon period, suggested as an alternative that he explore the Swan River in Western Australia, which had been partly surveyed by the French twenty years earlier and seemed from their frequent presence the place they were most likely to settle. Accordingly, Stirling left Sydney in January 1827 with Fraser (the New South Wales Government botanist) in his party, and by March had explored the Swan River. He returned to Sydney in mid-April calling at King George Sound on the way. Both his and Fraser's reports about the Swan River were enthusiastic,[4] and Darling promptly advised the Home Government, by despatches which Stirling himself carried to England, to establish a settlement there as soon as possible.[5]

However, the Admiralty reacted adversely, and the government decided to shelve the matter. Nevertheless, Stirling persisted in his views and scouted the possibility of forming an association for the purpose of settling the Swan River, and recommended that the British Government despatch a warship to the area to inhibit the French. The government, with a change of view, sent Captain Fremantle in the *Challenger* to the Swan River to take formal possession of the west coast of the continent, which he did on 2 May 1829. It also appointed Stirling to command a new settlement there.[6] The first band of colonists, with a detachment of soldiers, left England in the *Parmelia* and the *Sulphur* in February 1829 and on 18 June the formal settlement of Western Australia was proclaimed at Rous Head on the mainland and on Garden Island. Two sites were chosen for settlement: one, named Fremantle, as a port on the south bank at the mouth of the Swan River, and the other, Perth, as the seat of government, some distance up the river. The ceremony for the foundation of Perth was carried out on 12 August 1829 'by cutting down a tree on the allotment set apart for the military barracks'.[7] By happy coincidence or deliberate contrivance, the headquarters of the Department of Forests was until recently located almost on the spot.

In March 1831, for several reasons, the idea of maintaining a penal settlement at King George Sound was abandoned. It had never been successful; being under the jurisdiction of New South Wales, its situation relative to the new settlement was anomalous, and its penal nature was incompatible with one of the regulations under which the new colony was founded, that 'no convicts or prisoners of other description' would be sent there.[8]

Early Forest Industry

Although it is difficult to find convincing supportive evidence for the statement by 'our Western Australian correspondent' in an early copy of the *Australian Forestry Journal* that 'the foundation of the settlement on the Swan River was largely the result of reports received in England of 'the existence of immense forests of valuable hardwoods in the southwestern corner of what was then generally known as New Holland',[9] the usefulness of the various timbers in their immediate vicinity quickly impressed itself on the first settlers. During the early years of the colony, buildings were constructed almost entirely from local timbers, particularly Swan River 'mahogany' (*Eucalyptus marginata*), which was to be called by its native name 'jarrah' from the mid-1840s.[10] Jarrah, wandoo and banksia were also used extensively in building the boats on which the colony depended for general communication, situated as it was on a river and remote from any other settlement on the continent. Boats were needed, too, for fishing, whaling and sealing.

The local success of these timbers raised the obvious possibility of an export trade and, within the first year of settlement, samples were sent to England. In 1836 the Admiralty ordered 200 tons, and double that quantity in the following year.[11] Over the next twenty years, an export trade to South Africa, India and the new colony of South Australia gradually developed. The first sawmill in the colony is reported to have been established at Mount Eliza in 1833,[12] but the first to attract public attention was one powered by steam established at Guildford in 1844, its chimney being described by a Perth newspaper of the time as 'chaste yet ornamental and in workmanship exquisite'.[13] Another which attracted considerable interest, built near Busselton in 1845, was combined with a flour mill.[14] The first sawmill of any size, and operating for any appreciable length of time, was built at Quindalup in 1858.[15]

Concessions and Licences

To this stage, however, for various reasons, neither the local industry nor the export trade in timber lived up to the expectations of the colonists, who saw the forests as a potential source of wealth.[16] Foremost among these was the problem of handling and transporting the large, heavy logs from the forest to the mill and the heavy timber from mill to port; and the provision of adequate port facilities. All this required considerable capital and entrepreneurial skill and experience which the colonists did not have. Nor did they have the necessary skill and experience to season the eucalypt timbers properly for an export market. Added to this was the shortage of skilled labour. The introduction of the convict system in the early 1850s provided the industry with some labour, and it was stimulated indirectly by the increased public-works program and by the need of ships for return cargoes to England. Nevertheless, exports of timber were still comparatively small and were outstripped in value by sandalwood.

By the late 1860s, it seemed apparent to Governor Weld that more attractive conditions would have to be established for entrepreneurs of sufficient experience, backed by sufficient capital, to make a financial success of the timber industry and to generate wealth in a colony badly in need of it. Between 1869 and 1871, successful negotiations were made with three entrepreneurs for the investment of substantial finance in the industry in return for forest concessions. They were later to be a considerable problem for a forest service attempting to establish a sound forest policy, but the arrangement was eminently understandable in the context of the time. Although the details of the agreements differed in some details, the terms under which the concessionaires were granted a lease were subject to the same basic conditions. These were (i) the concessionaire had exclusive rights to cut timber on the lease area subject to the government also being able to do so for public purposes; (ii) the concessionaire was to

pay a licence fee on the basis of the area worked each year and to pay sawyer's fees on the basis of the number of sawyers employed; and (iii) the government would not charge duty on timber exported by the concessionaire. The three concessions were Mason's Canning Concession of 40,000 ha; the Western Australian Timber Company's concession of about 80,000 ha at Lockville (referred to also as the Ballarat Concession, being composed of Victorian shareholders), and the Jarrahdale concession of about 100,000 ha. The last attracted an annual rental of £50, whereas the Lockville Concession was free. Although these companies were not successful in their ventures, other entrepreneurs who took over from them were.

Supplementary regulations issued in 1875 empowered the Governor-in-Council to grant special timber licences for up to fourteen years under conditions he might prescribe, at the same time protecting the rights of the previous concessionaires. The major licensee was M. C. Davis, who was granted a concession of 18,000 ha of karri forest in the south-west of the colony in 1882,[17] and who established at Karridale, the centre of his operations, a largely self-contained estate which by the turn of the century supported about 800 people.[18] This firm also made an important contribution to Western Australian conservation history by importing marram grass from South Africa in 1892 and planting it on the Boranup Sand Dunes, which it fixed very successfully.[19]

Early Investigations and Reports

The number of licences issued and the potential for exploitation under the very limited government control began to concern some people. The government itself showed little concern in 1874 when it responded to a Colonial Office inquiry that 'it was as yet too early to institute a policy aimed at conserving the forests',[20] but it changed its mind in 1876 at least to the extent of appointing a Select Committee of the Legislative Council to look at the land regulations and their consequences. Surveyor-General Fraser, moving the adoption of the report, endorsed one of the committee's concerns at the wastage from hewing and the government responded by raising the fee for a hewing licence considerably, a move which was met with great indignation by the industry.[21]

In 1897, Ferdinand von Mueller, Government Botanist of Victoria, with an established record of exploration and critical observation of natural resources, was asked by the government to report on the colony's forest resources. He suggested establishment of a forest administration, which he saw as essential to the colony, with a central office supported by District Boards:

> . . . each of a few members chosen for the sake of their experience in wood industries or for their predilection for cultural pursuits with a

> State Officer in each district as the practical functionary of the Board . . . an industrious man, merely of horticultural experience, circumspect intelligence and of modest aspirations.[22]

He saw the appointment of such Boards as one of two cardinal measures; the other was their endowment with a portion of the revenue from the forest. However, the government appears to have shown more enthusiasm in organising the report than in responding to it. His plea for 'a rational far-seeing provision for the maintenance, if not the enrichment, of the forest treasures . . . however indiminishable these may appear to be at present' met with no response.[23]

Sir Malcolm Fraser, formerly Surveyor-General and now Colonial Secretary, also saw the need for the maintenance of von Mueller's 'forest treasures' — but not yet. In 1882, he presented a report which included 'some remarks and suggestions on future conservation and management of the timber areas, from various authorities'.[24] For example, Mr Ivey, Chemist of the Victorian Department of Agriculture, had suggested to the Secretary of his Department various measures which would 'pave the way for the gradual introduction, as the country becomes prepared for its administration, of a thorough system of forestry' and which formed an eminently sensible base for demarcation, reservation and control of the forest resource. Captain Campbell-Walker, Conservator of State Forests of New Zealand, thought the question of direct 'financial gain or extracting a revenue from the forests by the State should ever be subordinate to their conservancy for climatic considerations and improvements to meet the demands of the future' but that 'there is no reason why . . . the State . . . should not derive from them the maximum amount of revenue compatible with the general welfare of the people'. In speculating on what should be kept and what parted with, he gave as his opinion 'that probably nine-tenths of the existing area under forest in New Zealand may in time be cleared away or at least not specially reserved and devoted to the growth of timber'. An article in the *Australasian* of 22 March 1879, which raised the horrific contemplation of a globe that had been completely desiccated through intemperate forest destruction, was also quoted. For his part, Fraser considered:

> there can be no doubt that the preservation of the forests is a matter of considerable importance to the future of this Colony; nor is there much doubt that very great waste is taking place every day; but at present the untouched forest area of the Colony is so great that no anxiety need be felt as to the supply falling short for very many years to come.

Nevertheless, he believed that 'it might be of very great advantage to the Colony if a scheme of forest conservancy, more particularly for the

prevention of wilful waste, or wanton destruction by fire, and the protection of young trees, was organised', and he seems to have given tacit approval to the suggestion by Mr Randell, MLC, for the appointment of a permanent board, as in South Australia, to concern itself with forest conservancy and to endorsement of that government's acceptance that 'the systematic conservancy of existing and the planting of new forests' was a legitimate responsibility of the State.

A strong recommendation for conservancy measures from Fraser, in his position of influence, may well have stirred the government to action, but his indecisiveness at the time is understandable. The government had limited resources and any revenue, however small, was valuable. But, most of all, the extent of the forest area seemed overwhelmingly large in relation to the operations and industry on it. In Fraser's view, the area 'occupied by the principal Eucalypti' included '14,000 square miles of jarrah and 2,300 square miles of karri'. This added to von Mueller's estimate that 'The forest regions of extra-tropic West Australia occupy an area equal to the whole territory of Great Britain'[25] could also only stimulate in the mind of a recent resident the thought of an almost limitless resource.

Amongst Fraser's 'various authorities' with suggestions on future conservation and management of the timber areas was J. S. Harris, lately Resident-Magistrate of Vasse. He saw the conservation of the forest as:

> a rather difficult matter, at least until an Act is passed for their better protection. In the meantime, however, an officer should be appointed, whose duties would be to visit all the timber stations, north and south . . . to seek every information with the managers of the several stations, generally well disposed, and to suggest to them the necessity of economising the timber, when supported by the laws in this Colony.[26]

On 18 September 1882, T. C. Carey, the Member for Vasse, asked the Legislative Council to present an address to the Governor requesting him to take steps to protect and conserve the forest. The Governor's response was to appoint J. S. Harris as Inspector of Forests. He was by this time at least beyond the age normally recognised for active public service and could hardly have been expected to advance the cause of forest conservation to any great extent even though the expense of his services to the government seems to have been limited to a '£50 forage allowance'. Nevertheless, if the three reports relating to the industry in the southern part of the colony which he presented to Parliament are fair witness, he appears to have applied himself assiduously to his duties. He died in 1886.[27]

Slump and Boom in the Industry

The 1880s saw little advance in forest conservation. For most of the decade there was a slump in the industry. The main problem was

transport. Railways were badly needed to bring the timber to the major towns and ports on the coast. The government was unable or reluctant to divert funds for this purpose, and entrepreneurs needed a lot of persuading that large capital investment in the timber industry was likely to be rewarding. But interest in the industry developed gradually during the period and the several large concessions changed hands with a gradual extension of both railways and tramways, so that by 1891 there were more than 1400 km of railway in the colony. Nine hundred kilometres were on the land-grant principle which the government had introduced some years earlier to encourage construction, 300 were government owned, and 200 were owned and operated by the timber companies.[28] Although the export value of timber represented only a small percentage of the total, it was a useful contribution, and in many areas the contribution of the industry to the local economy was considerable. In 1884, O. and R. Millar, railway contractors based in Melbourne, contracted to build a railway in South Australia. They obtained a timber licence to get the sleepers for it from the southern forests and later constructed a railway from Albany to Torbay on the land-grant principle.[29] This was the beginning by Millars of what became nearly a century's prominent involvement in the industry in Western Australia.

By contrast with the 1880s, for complex reasons, the 1890s saw a boom.[30] One reason appears to have been the great expansion in public works resulting from the discovery of gold, particularly the extension of railways, which tapped a major part of the forested land in the south-west.

Whether attracted to the colony because of the boom, or because they wished to ensure supplies of jarrah for road-building blocks, which formed a major part of the exported material of the time, English financiers developed a new interest and began to take over majority control of the concessions. By the end of 1898, nine companies, practically all of which were owned by English capitalists, held nearly 400,000 ha in leases with twenty-seven mills[31] and the opening up of the forests and vigorous competition amongst the companies had pushed exports to a new peak. But a peak in exports did not necessarily mean a prosperous industry. The industry was rapidly heading for a major depression because of the intense competition for what was a limited market. Therefore, in 1902, after several years of negotiations, eight major companies combined to form Millars Karri and Jarrah Company. However the terms of the original timber licences held by the concessionaires, and evidence that speculation in timber lands by other entrepreneurs was developing, had prompted the government in 1898 to pass a Land Act which included sections dealing with timber lands. One of these sections limited the area of a lease to 30,000 ha. This obviously introduced a difficulty into the amalgamation of the companies and moves to

amend the Act to regularise the combining of the holdings (which totalled over 300,000 ha) were one of the aspects of the industry which led to a Royal Commission in 1903.

What was to become the largest timber company in the state, Bunning Brothers, expanded from the building trade into sawmilling about this time (1905) with the purchase or construction of a number of small sawmills, though its period of strong growth into industry leadership did not begin until about 1940.

A Conservator and a Department

The boom in exports and the increasing rate at which the forests were being exploited prompted a concern for conservation on the part of several Members of Parliament, who pressed for action by the government. In 1894–95, the government voted £250 to employ a Conservator for six months. His duties were to include working out new regulations, preventing the destruction of young trees, cultivating softwoods and looking after the industry generally.

Early in 1895, the government, through the Bureau of Agriculture, engaged J. Ednie Brown, erstwhile head of the South Australian and New South Wales Government forest services, to report on the extent and value of the forests of the colony and to suggest means for their conservation and utilisation. Brown approached his new assignment with the same vigour and enthusiasm that had marked his entry into public affairs in the other two colonies. He arrived in Perth in March 1895 and proceeded very shortly afterwards to the field. Eight thousand kilometres later, by rail, buggy and horse, accompanied for much of the time by N. J. Moore (a surveyor who was later to become Premier), he was ready with a comprehensive report covering the species, their extent and value, records of concessions and licences, statistics of timber exports and imports, and recommendations for planting exotics, for reservations, for a new Forestry Act and for the organisation of a Forestry Department.[32] It was a profusely illustrated report, which was to run to several editions, which were subsidised by the industry, and at the time was the best source of information on the forest resources of the colony. Brown stressed two things: there had to be a Forestry Department with its own ministerial head; and it had to have an appropriate Act, with accompanying regulations, expressing the government's forestry policy. It would be difficult to fault his recommendations. Implemented then, they would have brought about a sound forestry policy twenty-five years sooner.

Ironically, Brown may well have contributed to the government's lack of interest in implementing his recommendations: his report estimated the total forest land as 8 million ha. This may have been a considered estimate from his extensive travelling; he may have thought it prudent to accept Fraser's estimates of thirteen years before without question; or it may have been a convenient support for

his unbounded enthusiasm at never before being 'privileged to deal with anything so full of possibilities of permanent national wealth'. Whatever the reason, it must have provided comfort to a government not strongly motivated to the reform of forest use and ready to take convenient shelter in the old myth of unlimited resources. Something closer then to the estimate of 1.25 million ha, which, made twenty-five years later, seemed more like the real situation, might have stirred government members to some action. As it was, their reaction to Brown's report was hardly whole-hearted.

It is not clear when Brown was appointed to the post of Conservator which the government had budgeted for in 1894–95 or when the first government forestry organisation was established; but in the first annual report of the Woods and Forests Department for 1896–97,[33] signed by him as Conservator, he indicates that in the middle of 1896 the government decided there should be a Department of Forests as a branch of the Department of Lands and Surveys. It seems he was responsible for the change in its name to Woods and Forests Department, which he thought a more appropriate title on the grounds that the government had expressed its intention to establish 'woods' of exotic conifers, which the colony lacked, to support the 'forests' of native eucalypts, which it had in abundance. If he was happy with the name of the department he was not happy with its administration. The control and record of licensing, which was the key to control of operations on the forest, remained with the Lands Department, and he was starved of men and money.

Denied an autonomous Department responsible to its own Minister, as he had recommended, he was also to be denied effective legislation. One of the problems was the varying conditions of access to timber which had been established during the previous thirty years. It was difficult to bring in legislation which would not deprive the old concessionaires of the rights granted to them because of their initiative years before yet at the same time would allow the licensees of later times, who had to operate under more stringent regulations, an opportunity to compete with the concessionaires on reasonably equal terms. It was a problem that was to defy satisfactory solution for many years. Brown did what he could with the staff and money at his disposal in the face of an unsympathetic government, an apathetic public and a hostile industry. To the question of afforestation of the coastal sands with softwoods, which had been raised a number of times in Parliament, he brought his arboricultural interest and skills with some success. His particular contribution, says Robertson, was that 'he provided the first example of a public man in the colony intensely enthusiastic about the needs of forestry in Western Australia; his example may well have injected some sense of responsibility into others'.[34] He died in October 1899 at the age of forty-nine.[35]

Brown was succeeded by C. G. Richardson, who, as a clerk in the Lands Department, had transferred to the Woods and Forests Department on its establishment and at the time of Brown's death was second in seniority.[36] At first 'acting for the Conservator', he went on to head the Department by default because the government did not appoint anyone else, for seventeen years. There was little in the way of progressive forestry during this period.

In October 1902, concern by some people about the lack of a forestry policy and a professional to head the Department, and also about the government's attempt to bring down legislation which would authorise the amalgamation of the licence areas of the companies which had combined to form Millars Karri and Jarrah Company, was crystallised in a motion in the Assembly by Charles Harper which eventually led to the appointment of a Royal Commission chaired by him in April 1903. Its terms of reference could hardly have been more embracing — it was directed to investigate the supply of hardwoods in the state relative to supplies from the eastern states and the rest of the world; the rate of depletion and waste of timber in the native forest; the need for softwood afforestation, harvesting and marketing, regulations and reservations; and any other aspect which it might be in the public interest to consider. The commission quickly presented an interim report on conditions for the opening of reservations to sawmillers, which the government was too occupied otherwise to be interested in. Its final report was presented in 1904.

Throughout, the commissioners stressed the need for prompt legislative correctives: 'at whichever phase of forestry we as a community may look . . . the same dark shadow of the Nemesis of neglect threatens'.[37] They recommended the Department be placed under the control of an Inspector-General who was qualified both by scientific training and experience, supported by a Board of three people qualified by a knowledge of local conditions. It was a comprehensive report after a serious effort to meet the wide-ranging terms of reference. One of the few things to come out of it was the appointment in 1905 of a Forests Advisory Board of three members, which was instrumental in having new timber regulations gazetted. These were sound but unfortunately were never effective because of inadequate staff to supervise their implementation. The Board was responsible directly to the Minister and quite independent of the head of the Department, a feature which must have inevitably jeopardised its effectiveness, and it ceased to function in 1908.[38]

A New Conservator and the First Legislation

Successive governments took little interest in forestry for a number of years until in 1914 the Minister for Mines, who by this time was responsible for the Department, was prompted to engage the services of D. E. Hutchins to report on the forests and forestry of the state. His

opening remark on the subject was 'West Australia requires a working Forest Act, not a rider to a Land Act'.[39] He commended the tests of Western Australian timbers which had been carried out by G. A. Julius: 'They reveal a curious inequality of Government effort. The mechanical tests . . . are more than enough for the next century while the State's treatment of the forest, necessary to preserve the timbers, is antiquated by at least a century'.[40] He thought that 'nearly the whole work of constructive forestry . . . remains to be undertaken'.[41] Although he made a number of recommendations, as a special commission for the Western Australian Government, his report must have been something of a disappointment. Several other states were treated much more thoroughly. However, it did convince the Minister that the appointment of a qualified man to head the Department was essential, and C. E. Lane Poole was appointed in March 1916 as Inspector-General, a title changed to Conservator in September. Richardson, whom he replaced, retired a year later. Born in England in 1885, Lane Poole had graduated from the National Forestry School at Nancy, as had Hutchins under whom he worked in Cape Colony. Prior to his appointment he had been Conservator in Sierra Leone.[42]

The Minister's enthusiasm for an effective departmental head was not shared by the government in general, which was as apathetic, if not antipathetic, as the public to the better management of the state's forests. Lane Poole set out to proselytise both government and public with a flow of newspaper articles and speeches. Educated in the Nancy tradition, he needed no persuasion about the basic necessity of the things Hutchins had recommended — a survey of the forest resources, the demarcation of areas adequate for a continuous supply of forest services for as far ahead in the future as could be seen, their permanent reservation against alienation for any other purposes, and the implementation of forestry operations through written plans of management. He gave high priority to the classification of the forest resource, which Richardson had started but had not been able to push very far, and by which forest rangers and land surveyors working in cooperation were defining the areas most suited to agriculture and to forestry and classifying the forest areas as cut-over or not cut-over. It was rapidly becoming clear that the previous estimates of the area of jarrah forest were grossly confused with the area over which the species occurred and that it was more like 800,000 ha, of which three-quarters had been cut-over.[43] Nor did Lane Poole need to be persuaded that adequate legislation was the essential prerequisite for his program of reform, for, in its absence, he could get neither funds nor staff to carry out forest works despite a surplus of revenue over expenditure, accumulated since the inception of the Department, of nearly $1 million. As 'purely a revenue-collecting machine',[44] the

Department's other interests were entirely subordinated to maintaining this surplus.

For the drafting of this legislation, he drew from his considerable store of energy and imagination. The subsequent Forests Act of 1918 has been referred to many times in forestry circles in Australia as a model piece of forestry legislation. However, Lane Poole's feelings about it were mixed. At least he had a sympathetic and enthusiastic Minister in R. T. Robinson, who, in presenting the legislation in September 1918, spent a considerable time attempting to impress Parliament with the purpose and advantages of a forestry policy, a subject on which he had already expounded at length at the fourth Interstate Conference at Perth in November 1917.[45] The essence of the proposed policy was that all prime timber be permanently reserved for forestry purposes; the principle of sustained yield should be applied to each mill so that the mills could have a guaranteed life, thus ensuring better social conditions for mill workers; appropriate silvicultural operations would be implemented to ensure regeneration of the best quality timber for the future; and plantations should be established to meet the softwood requirements of the state.

Although most MPs greeted the Bill favourably, there were several areas of contention and a number of amendments were proposed. Hewing was a controversial subject, as it had been for years. As a compromise, hewing within a state forest was to be restricted to those who had followed that occupation prior to the passing of the Act, a concession to the fact that many were away overseas serving with the Australian Imperial Forces (AIF). The extent of the power proposed for the Conservator worried a number of people used to the previous lack of control. To many who saw the forests as a source of State income, the proposal to give the Conservator three-fifths of the net revenue to spend on forest operations seemed needlessly extravagant. Eventually, after much debate and compromise, the Bill passed and was assented to in January 1919.

As an index of change from laissez-faire conditions to organised forestry, it seemed exemplary legislation. It established a Department and its relationship to a Minister, the position, powers and responsibilities of the Conservator, the appointment of staff, the matter of reservations and management by working plans, sawmilling permits and a royalty system. But Lane Poole had his reservations. Some of the amendments to his original proposals had perturbed him and, though he saw the Act as a suitable base for effective forestry, he pressed for amendments to it as soon as possible. His fears that the realities of the situation, as exemplified in the debate of the Bill, would overshadow the high-sounding principles which the final Act expressed were soon realised. In his attempts to implement the policy which the Act set out, he seemed to have few friends and little support. He certainly received none from agriculturalists, sawmillers

or hewers, nor from members of the government or the public, all of whom were somewhat sensitive to articulate Anglo-Irishmen of forcible views and missionary zeal in colonial situations. For the next two years he must have often wondered if his efforts to bring organised forestry to a state so badly needing it, but obviously not wanting it, were worthwhile.

Regulations for tighter control on felling which Lane Poole sponsored in 1920 aroused considerable antagonism. He received little support from the government, led by Premier James Mitchell, who was his severest critic, and his Minister thought some of the regulations 'absurd'. The crux in a hostile situation came in 1921 over the concessions and leases, the origins of which lay in Governor Weld's attempts, fifty years earlier, to give the colony a financial footing. By the 1920s, successively stricter Acts and regulations had disadvantaged the small, new sawmillers relative to Millars 'combine', which at that time held more than 2 million ha under relatively favourable conditions of supply, royalty and operations. The government's legal obligation to observe these conditions hampered Lane Poole's efforts to introduce more equal conditions, enhanced royalties and stricter controls. From 1918 to 1921 he was involved in a running battle with Millars and successive governments over the leases and concessions. This ended in his offering his resignation in July 1921. The Premier was not reluctant to accept it, and S. L. Kessell, then Assistant Working Plans Officer and Forestry Instructor in the Department, became Acting Conservator.

Lane Poole ceased duty on 22 October 1921.[46] His annual report for the year ended 30 June 1921, submitted a few weeks before he left the service, outlined his case and views in terms more blunt and explicit than are usually accepted by Parliament in annual reports. Occupied as he was with efforts to establish forestry control, he had limited opportunity to implement the philosophy of working-plan control, backed by statistics of growth, which he espoused at the Interstate Conference held in Perth in 1917. Even his efforts to repair the damage done before his time in the ill-advised clearing of the Mundaring Catchment Area were to attract opprobrium from a later Royal Commission. But the interest he took in several other matters was to have far-reaching and favourable consequences. One of these was for a supply of professional foresters.

Recommendations for tertiary professional training had been made at the first Interstate Conference, held in Sydney in 1911. Stronger proposals were put forward from the third conference (Adelaide, 1916), which Lane Poole attended after only three months in the country. From the 1917 conference onwards, he became a zealous crusader for a central forestry school. When, eventually, the Australian Forestry School was established in Canberra in 1927, Lane Poole, as Inspector-General of Forests for the Commonwealth Government,

acted as Principal, a post he held until 1945. He also stressed the need for non-professional support staff and established a school for training at this level at Ludlow, 180 km south of Perth. Again, his recognition of the need for research, particularly in minor forest products, which he saw as being of special value to Western Australia, involved him in the foundation of what was to become the Division of Forest Products, CSIRO. His loss to Western Australia was one which forestry there could ill afford, needing as it did the kind of critical analysis and technical competence so evident in his report to the first British Empire Conference in London in 1920.[47] In a short space of time, he had clearly diagnosed the major problems in the state, offered solutions and was prepared to pursue them with vigour. It was unfortunate that few of his political masters could agree with his cause or his course.

Another Start

Kessell took over as Acting Conservator at an obviously difficult time. Born in Wollongong (NSW) in March 1897,[48] he had obtained a forestry degree from the University of Adelaide, served with the AIF in World War I, and followed this with a Diploma of Forestry at Oxford under Professor Sir William Schlich. He had had a little over a year's service with the Western Australian Forests Department as Assistant Working Plans Officer before he was thrust into the top job and a political 'hot seat'. Within another six months, the state had its third Royal Commission on forestry, with three members of the Legislative Assembly acting as commissioners. The chairman, W. G. Pickering, one of Lane Poole's few supporters in the House,[49] had originally moved in the Assembly that a Select Committee be appointed to inquire into (i) the working of the Forests Act of 1918 generally; (ii) the financial clauses of the Act and their operation; and (iii) the extension of Millars Timber and Trading Company's leases and concessions; and to report with recommendations to the House. But, by direction of the Premier, a Royal Commission was appointed instead and the terms of inquiry set as '(1) The financial provisions of The Forests Act 1918 and the operation thereof and (2) The administration of the said Act generally'. Reference to the extension of Millars' leases and concessions, 'which was the immediate cause of the tension between the Minister and the Conservator',[50] was omitted.

As well as the commission inspecting forest areas in the state, the chairman, at his own expense and against the wishes of his fellow commissioners and the government,[51] attended the sixth Australian (Interstate) Forestry Conference in Brisbane, where he took an active part in the debates and inspected field and office operations in the other states. The commission examined more than a hundred witnesses, one of whom was Lane Poole, now in unfettered form; the rest, in the commission's words, 'dealt mainly with the subject from the

point of view which is termed practical and pointed, in the main, to a contradiction of the premises advanced by the Ex-Conservator as essential to forestry conservation'.[52]

The commission made a number of recommendations, among them being that control of the Forestry Department be vested in the Conservator, as set forth in the Act, with the support of an Advisory Board of two; that the allocation of three-fifths of the net revenue be adhered to, with an increase in royalty as soon as industry showed signs of revival; that loan funds be made available for afforestation with conifers, particularly maritime pine (*Pinus pinaster*); that areas for forestry control agreed by the Lands and Forestry Departments be immediately gazetted; that the system of fire control be maintained and extended; that forests on all catchments be reserved and placed under the control of the Forests Department; that permit areas be extended where conditions made that necessary for profitable cutting; and that the pure karri country not be alienated for any purpose. In its report the commission also discussed its capacity to comment on the question of the extension of Millars' concessions. It offered the general opinion that the system of concessions and leases was not in the best interests of the state and recommended all future methods of exploiting the forests be on a permit basis.[53]

The following year, in response to a motion in the Assembly by Mr Pickering that the government give effect to the commission's recommendations, the Minister for Forests referred to the history of a few of them — a departmental recommendation for the reservation of nearly a million hectares of jarrah was being considered; there seemed to be only about 30,000 ha of karri worth permanent dedication; a proposal to increase royalties had been strenuously opposed by the sawmillers; the government was averse to the appointment of an Advisory Board; a start had been made with the provision of loan funds for coniferous afforestation; and there had been some extension of the fire-control system.

Kessell was confirmed as Conservator on 1 January 1923[54] and continued in that office for the next eighteen years. Among the many problems he inherited, the vexatious matter of royalties was a major one, but eighteen months of action and reaction between the government, the Forests Department and industry led to arrangements which brought reasonable satisfaction to all.

The other major problem took rather longer to solve. It was an age-old one — the competition between agriculture and forestry for land. Most people agreed that the prime jarrah country was unsuitable for agriculture, and the classification of the jarrah region had been done by the Lands and Forests Departments on this basis. But their recommendations for the dedication of nearly a million hectares of jarrah country as state forest as early as 1919 continued to be ignored by the government, which for various reasons was unwilling

to reserve such a large area. Successive governments and Royal Commissions were undecided over the karri country. There seemed to be a continual worry that, if it were reserved to forestry, it would be lost to settlement forever; and there were varying estimates of how much of the area was suited to agriculture and how much would be needed for that purpose in the future. Preliminary skirmishing on the matter, which started between Lane Poole and Mitchell shortly after Lane Poole was appointed, developed into open war — a war Lane Poole was bound to lose as Mitchell gained more and more political power as a Minister and eventually, in mid-1919, became Premier. Moreover, Mitchell appeared more and more the champion of the mythological 'Aussie battler' to a public still unpersuaded of the righteousness of Lane Poole's cause.

In April 1920, following a paper by Swain on 'Australian forest ration and its apportionment', the fifth Interstate Conference on Forestry in Hobart endorsed a figure of about 10 million ha of indigenous forest as a necessary national allotment, being the sum of estimates provided by the states, as a compromise of likely and desirable targets for reservation.[55] A State Premiers' Conference of May 1920 adopted the report of the forestry sub-committee that this amount would be necessary to meet the future requirements of the country and endorsed 'the desirability of aiming at the reservation of this area', Western Australia's contribution to this total being 1.25 million ha. The Western Australian Government reported to this conference that the total reserved area was 18,000 ha, and that the survey of the whole of the jarrah country had been completed and the area to be excluded for agriculture had been agreed by the Surveyor-General and the Conservator of Forests, but that 'the question of the final dedication of State forests of this very extensive area of land has not yet been decided'.

> The Forests Act gives very wide powers to the Conservator of Forests once permanent reserves are made, and, before approving, the Government wishes to be perfectly sure that only land is being set aside which is carrying, or is likely to carry, marketable timber, and that its land-settlement policy is not unnecessarily retarded by holding up land more suitable for settlement than for the growth of trees.[56]

The government's land-settlement policy took practical expression when its Group Settlement Scheme commenced in 1921. The scheme became a major project in 1922 when the governments of Australia, Western Australia and the United Kingdom agreed to spend several million pounds in settling thousands of British immigrants in the south-west of the state. However, the scheme was quite unsuccessful and, fifty years after it began, the Forests Department, along with others such as the Agriculture Department, was given the job of finding solutions to the problems the scheme had created.

Kessell continued to plead unavailingly with the government to emulate the other states, which were making positive efforts to reach the agreed targets for forest reservation. However, by mid-1924, Western Australia's contribution to the national total was still only 20,000 ha, and the election of a new government, with a strongly hostile Minister for Lands, provided little comfort. Nevertheless, with the Premier more favourably disposed to forestry and a reasonably sympathetic Cabinet, the dedication slowly took place, and by mid-1929 the target was to all intents and purposes reached. The time was fitting — it was the decennium of the Department and the centenary of the state.

As might be expected, however, the program of dedication did not meet with universal approval. Certain groups reacted strongly to the idea of forestry tying up such a large area of land without any obvious use of it, and the Department was fortunate to come through the early 1930s with its reservations intact (except for small areas which it sensibly agreed should be revoked for settlement purposes). Under Kessell, Lane Poole's policy of bringing management operations under the control of formal working plans had been perpetuated, and by 1929 the area under plans approached 400,000 ha. In that year, the Department also presented for the Governor's approval a General Working Plan for jarrah. This plan aimed to place the timber industry as a whole on a permanent base by providing for a sustainable annual cut, a logical move because of the compact nature of the distribution of this species.

The world depression of the early 1930s brought a breathing space to the Department but, to a state heavily dependent on them, a fall in the prices of products of the land was serious and led to considerable unemployment. Like those of the other states, the Western Australian Government did not at first consider forestry as a means of providing suitable unemployment relief because of its long-term nature and lack of obvious and immediate returns. Eventually, however, all State Governments came to realise that forestry had the capacity to employ large numbers of men with a wide variety of skills and that they could be employed, given reasonable supervision and minimum expenditure on materials, on productive work, under generally salubrious conditions.

For almost a decade, an average work-force of about a thousand men, including hewers and sawmill workers from a depressed industry, were employed on a range of operations — rehabilitating exploited forest, planting pine forests, and extending communications and fire-control systems. During this period, the reforestation fund derived from the Department's revenue was considerably reduced because of the slump in the industry, and the Department had to depend to a large extent on loan funds, especially those for unemployment relief. The slump in the industry, allied with the

expiration of the old concessions and leases about this time (which then brought most of the forest area under working-plan control), also provided the Department with the opportunity to adjust demand and supply closer to the sustainable yield covered by the 1929 General Working Plan.

At the end of the 1930s, the emphasis shifted to fire protection. Because it was within the capability of an untrained work-force and because it was essential work, the unemployment relief work had been directed partly towards extending fire-protection measures. But work on forest treatment had itself considerably improved access and communications in the forest, and motor vehicles were becoming available to replace foot, horse and motorbike. A bad fire year in 1936–37 had emphasised how vulnerable the valuable forest treatment work of the depression years was to fire and provided the motivation for a drastic overhaul of fire legislation, which was thirty years out of date. Since its establishment in 1933 the fire weather research station at Dwellingup (the first of its kind in Australia) had provided considerable information on the influence of various meteorological factors on fire behaviour and fire weather was being more confidently forecast and fire hazard more accurately estimated. The imaginative use of tall trees for fire towers had considerably enhanced the detection system.[57] Two decades after its first effective forestry legislation, Western Australia had become a model in Australian forestry for fire-protection organisation and methods.

The War and Early Post-war Years

Kessell was seconded to the Commonwealth Ministry of Munitions in May 1941 as Controller of Timber and in December 1945, without returning to duty with the Department, he resigned to become managing director of Australian Newsprint Mills Ltd in Tasmania.[58] In Kessell's absence, T. N. Stoate was Deputy Conservator. He had occupied the position of Assistant Working Plans Officer of the Department while on extended leave from the New South Wales Forestry Commission in 1922, had become Assistant Conservator in 1927, and, as a Russell Grimwade Scholar, obtained the post-graduate Diploma of Forestry at Oxford in 1931. He was appointed Conservator to replace Kessell in February 1946.[59] Kessell's position as chairman of the consultative panel set up in 1940 in Western Australia, as in other states, to cope with problems of wood supply associated with the distribution of munitions was taken by Stoate when Kessell became Controller. The panel was replaced in 1942 by the appointment of A. C. Shedley (then Assistant Conservator) as Deputy Timber Controller. He held this post until 1948, when he became chairman of a Sawmillers Advisory Committee which continued for some years after the war to deal with the many post-war problems.

Owing to the enlistment of forestry and industry workers in the fighting and ancillary services, timber production during the war years decreased.[60] The post-war years saw a long struggle for the industry's rehabilitation. During the war the timber industry had been a 'protected undertaking' and workers in it had established new lifestyles — in towns rather than the bush. The post-war demand for labour and the opportunities for returned servicemen to retrain for more attractive occupations were additional factors affecting a return to pre-war employment levels in the industry. A supply of labour in the form of 'displaced persons' from Europe partly salvaged the situation, as did the advent of power tools for felling and more sophisticated and powerful harvesting equipment. The post-war years also saw an increase in the number of small mills, particularly close to the towns and the city, drawing logs from private forest land. During the war the cutting-off of the supply of plywood from traditional suppliers in the eastern states had led to the establishment of a local plywood industry based almost wholly on karri until the post-war years brought imports of plylogs from the south-west Pacific. Part of the Department's energy during the war years was diverted to the production of firewood for the metropolitan area, particularly using labour from the Civil Alien Corps of internees and prisoners-of-war. With reduced staff and revenue, there was no opportunity for development works and, by the the war's end, there was a large leeway in the works program.

One outstanding post-war requirement was the extension of the fire-control system over the considerable area of forest which was still unprotected, and this was assisted by the advent of bulldozers into forest operations and the availability of motorised equipment left over from the war. Another outstanding requirement was the expansion of coniferous afforestation, which had ceased at the outbreak of war, and a General Working Plan was prepared in 1949 in anticipation of the eventual allocation of loan funds. In 1944 it was decided to control the milling of all species on crown forests under one General Working Plan, and a general plan for jarrah, karri and wandoo to replace the original jarrah and karri plan came into effect on 1 January 1945. The determination of the Department to keep the cutting in the native forest in line with increment highlighted the need for continuous resource and management inventories and, like several other states, Western Australia took advantage of aerial photographs for this purpose (photos, equipment and expertise having become available because of the war). Perhaps the outstanding problem in the post-war years for the Department was the shortage of professional and non-professional staff. Western Australia was probably affected more than any other state by movement of graduate foresters out of the service (though mostly to forestry interests elsewhere), and it was a long time before the professional ranks were filled again. With no

formal school for training non-professional staff, Ludlow having closed down in 1929, the burden of training them fell on the professionals and the shortage of the latter exacerbated this problem too.

The Royal Commission of 1951

In 1951, forestry was subjected to its fourth Royal Commission. The reasons for it were, to a large extent, the product of the slow settling-down of social conditions after the war. The timber industry, being short of men and material, was quite unable to meet the post-war demand for wood, particularly for house building, which had practically stopped during the war and now had a leeway of five years to make up. To increase local supplies of wood, the government considered issuing a permit directly to a timber company in return for a guaranteed supply. Since, under the Forests Act, permits were issued only through tender or auction, the government presented a special Bill to Parliament to test its reaction to such a special arrangement. As a result, a Select Committee was appointed in November 1950 to consider it.

The committee made a number of recommendations, among them being that a Royal Commission be appointed to inquire into all phases of forestry, the timber industry and the timber trade. In March 1951 the government appointed G. J. Rodger, then Director-General of the Commonwealth Forestry and Timber Bureau, as Royal Commissioner.[61] Rodger had been appointed a Divisional Forest Officer in the Department in 1924, and since then had been Chief Forester of the Federal Capital Territory and Conservator of Forests in South Australia; thus he brought a wealth of experience to the task. He submitted his report in December 1951.[62]

The inquiry was comprehensive and the well-considered recommendations were typical of the commissioner's capability and purposefulness. He saw the policy of the Department, as expressed through the 1918 Forests Act and amendments, as sound in principle and soundly administered. On the matter of permits, which had been a source of contention for eighty years, he made a number of recommendations aimed at placing them under the control of the Conservator, with mechanisms aimed at ensuring fair treatment of permit holders. Administrative problems would be overcome by speeding up the recruitment of professional foresters, by delegating more responsibility, and by reorganising staff. The annual planting program of 800 ha of conifers towards a tentative target of 40,000 ha was endorsed. The commissioner also drew attention to the continuing shortage of funds for the Department and recommended the use of loan funds in addition to the revenue provided by the Act to bring the total to $2 million. He also considered that royalties were, in general, too low and recommended that their review, which was in hand when

the inquiry commenced, should proceed without delay. Considerable attention was also given to the question of further reservations, the extent of the forest resource and its capacity to meet the demands being made on it. It was clear that, despite the best efforts of the Department to obtain information, not enough was known about the structure and growth of the native forest to enable reliable regulation of the yield. Nevertheless, on the basis of current evidence, he recommended yields that appeared to be compatible with the capacity of the forest estate and, while endorsing the principle of managing by working plans, stressed the need for a vigorous program to obtain appropriate information on the structure and growth of the forest.

Unfortunately, neither the present government, nor the one which succeeded it in February 1953, showed particular interest in implementing the recommendations. Meanwhile the department, responding to the suggestions as, by and large, reasonable and desirable, moved to implement those it could implement without special government approval. Staff vacancies and inadequate salaries and status were critical matters at the time, following a reclassification by the Public Service in 1951, and vain attempts to rectify them were amongst the last efforts of Stoate as Conservator.[63] His statutory seven years were up in June 1953, but he carried on in an acting capacity until October, when A. C. Harris was appointed Conservator. Stoate then rounded off work on the research program of the Department, particularly in nutrition, in which he had a personal interest, until February 1954, when he went on long-service leave prior to retiring. He had served thirty-two years with the Department and had carried a particularly heavy load as its head in the last decade of his service as a result of the extra pressures caused by the war, and the staff shortages of the post-war years.

The 1950s and 1960s

One of the last graduates of the School of Forestry of the University of Adelaide, Harris commenced service with the Department in 1926, after a short period with the South Australian Woods and Forests Department, and became a Divisional Forester in 1928. In 1946 he resigned to take the post of Wood Procurement Officer for the Wood Distillation and Charcoal Iron Industry, which was established by the government because of the desperate shortage of iron and steel at the time, and two years later became general manager at Wundowie.[64] The environment for progress in forestry was probably more favourable than it had ever been. When Harris was appointed Conservator in 1953, he had a sympathetic Minister and increasing revenue from an increasingly active industry. He also had a Royal Commission report which gave strong support to the general direction in which the Department had been heading and recommendations to strengthen its new course to which the government had given at least tacit

approval. Because of the urgent need for funds, which depended heavily on revenue, Harris pushed ahead with the review of royalties which had started in Stoate's time. They were finally revised in 1955. The injustices of the 1951 reclassification of staff were to a large extent rectified in early 1954 and, by 1959, by recruiting graduates in Australia and overseas, the number of professional foresters had increased to more than thirty, from the low level of ten in 1947.[65] Impetus was given to the resources and management inventories by the Royal Commissioner's recommendation for their extension.

The commissioner had also recommended the establishment of a Land Use Committee of appropriate senior public servants. One such committee, appointed in late 1953, was composed of representatives of Forestry, Engineering, Soil Conservation, Agriculture, Lands and Surveys, and Treasury, and had made a number of useful decisions by 1959, when a new government replaced it with a Crown Lands Tribunal. The particular function of this tribunal was to advise the Minister for Lands and Forests on the future use of 'sparsely timbered Crown lands' within the higher rainfall region of the south-west of the state, there being considerable pressure from various groups at the time for the release of this land for settlement and investment. By and large, over the ensuing years, the decisions of the tribunal were fair to forestry, and by 1970 the likely limit to reservation seemed to have been reached at a total of 2 million ha.[66]

Amendments made to the Forests Act in 1954 required the Conservator to have appropriate professional forestry qualifications. They also gave him more control over permit renewals and royalty redeterminations, and increased the proportion of the net revenue returned to the Department from three-fifths to nine-tenths, a welcome lift in view of the fact that gross revenue was to reach $2 million in two years' time. Harris also shifted the emphasis from total protection against fire to prescribed burning (at night in warm weather, or by day in early spring or late autumn) of large areas of forest to reduce the effects of wildfire. Within a few years of his appointment, he reported the successful prescribed burning of about 300,000 ha of jarrah forest. The effective implementation of this changed policy, however, really came after successful trials of aerial ignition techniques in the summer of 1966. These enabled large areas to be lit and burned on the few occasions when fuel and weather conditions were amenable to the operation and thus reduced the burning rotation to a desirable period of four or five years. Throughout this period, access and communications were extended as fast as funds allowed and new products of technology became available.

The change in administration also prompted a review of coniferous afforestation policy. By 1954, because of the adequacy of coastal soils suitable for pinaster pine and a shortage of land for radiata pine, the 8000 ha of plantation was composed of 80 per cent pinaster and 20 per

cent radiata. However, estimates of growth and yield suggested that radiata pine on suitable soil could be grown and marketed profitably anywhere in the south-west, whereas pinaster pine was only profitable within an 80 km radius of Perth. Therefore the department set about obtaining as much suitable land for these species as possible, including the purchasing of freehold land for planting radiata pine where size, location and price made that feasible. Within five years, close to 8000 ha of suitable radiata pine land had been purchased and a large crown area of the coastal plain suitable for pinaster pine had been dedicated as state forest. By 1960, the early plantings were also contributing 35,000 cubic metres of logs, particularly for small mills set up on site by the Department to utilise the thinnings.[67] The promise given by the use in the early post-war years of aerial photography in resource and management inventories had prompted the Royal Commissioner in 1951 to recommend its extension, and within ten years the Department had made enormous strides in topographic and type mapping and quantitative estimates of both state forests and other crown land suitable for reservation. Aerial photography also proved useful in many other forestry operations.

In 1957, Harris saw fit to express his indignation about a problem of Commonwealth–State relations.[68] Since Federation, forestry and forestry-based industries had experienced a number of such difficulties.[69] To ensure supplies of hardwoods for South Australia and also for the Commonwealth Railways during World War II, the Commonwealth Government, under its war-time regulations, had imposed export restrictions on Western Australia. It was tardy in lifting these restrictions after the war, despite the State Government's efforts to have them removed in view of its severe loss of overseas trade, which had been an important revenue earner for a long time. Owing to credit restrictions imposed by the Commonwealth Government in 1956–57, there was a widespread recession in the building industry and an accompanying decline in the timber trade. At the same time the Commonwealth Government, which controlled importing through its powers over import licensing, had increased the limit of imports, thus adding to the problems of local wood producers. In the eyes of other countries, Western Australia had become a doubtful supplier, since it had to qualify its quotations as being subject to the Commonwealth granting an export licence, a qualification which also militated against its getting firm shipping space. Under these circumstances, it was unable to expand its overseas market quickly enough to offset the local slump and it found South Australia, whose interests it had been forced to protect in war-time, not particularly sympathetic to its present predicament. Direct and indirect controls over Western Australian forestry and industry by the Commonwealth had, Harris pointed out bluntly, acted to the detriment of the state. After persistent efforts, export control was lifted in July 1957, but its

restoration still threatened the industry. He thought a much better form of control lay in the Conservator's control of sawmilling permits. And he felt strongly that, in such cases where a state was forced to make sacrifices in the national interest, some form of financial compensation was in order. It was a very natural reaction of any service head whose capacity to implement a much needed program of works was dependent on the revenue from the wood he was able to sell.

Throughout the summer and autumn of 1960 above-average rainfall caused a build-up of fuel in the forest. A dry winter and spring were then followed by a hot, dry 1960–61 summer with very unstable weather conditions in which the south-west of the state was devastated by fire. In April 1961 a Royal Commission was established to inquire into these bushfires, 'the measures necessary or desirable to prevent and control such fires and to protect life and property in the future: and the basic requirements for an effective State fire emergency organisation'. G. J. Rodger was again appointed Royal Commissioner; his inquiry was wide-ranging and its recommendations constructive.[70]

Some of these recommendations were directed at the Department. More staff should be involved in planning and coordinating bushfire control in order to meet emergency conditions; auxiliary manpower and equipment were needed to carry out protective burning and fire fighting; the Department should carry out more research into both the technical and practical aspects of fire control; and it should make every effort to improve and extend the practice of control burning and to improve the efficiency of fire-fighting gangs, radio and other equipment. The other recommendations referred to the Bush Fires Board, bushfires legislation and rural fire control. This resulted in an overhaul of the legislation and the functions of the Board and Bush Fire Brigades. D. W. Stewart has described it as a 'landmark' in bushfire control in this State'.[71]

Programs and Problems of the 1970s

Administration

At his retirement in July 1969, Harris was succeeded by W. R. Wallace, who had been a member of the first intake of the Australian Forestry School in Canberra in 1927 and had taken up duty with the Forests Department in 1929. He became Divisional Officer at Dwellingup in 1933 and played a leading role in the management of the jarrah forest during his next twenty years there. He was also prominently involved in the initiation there in the mid-1930s of research into the determination of fire danger and the forecasting of fire weather. Wallace retired in January 1972, and D. W. Stewart was Conservator until his retirement in the following July. He was also a member of the first Canberra intake of the Australian Forestry School

and, as Divisional Officer at Manjimup from 1933 to 1954, played a leading role in the management of the karri forest. He was the Russell Grimwade Scholar to Oxford in 1950 and had succeeded Wallace as Deputy-Conservator in 1969. His successor as Deputy-Conservator in January 1972 was B. J. Beggs, who succeeded Stewart as Conservator in July. Beggs was appointed for a second seven-year term in 1979.

Jarrah Dieback

During the early 1920s, small groups of dead and dying trees and shrubs were observed in the jarrah forest. Dead or dying eucalypts are so common in much of the eucalypt forest and woodland of Australia that these patches did not excite unusual attention, particularly in a forest that was so frequently affected by fire. But continued reports of such occurrences and confirmation of their extension, particularly in apparent association with the large-scale introduction of earth-moving equipment following World War II, prompted more concern. This was one of the reasons for the establishment of a research laboratory at Dwellingup in 1948 in collaboration with the Commonwealth Forestry and Timber Bureau (later the Forest Research Institute).

Although many lines of investigation were pursued, it was not until late 1964 that the fungus *Phytophthora cinnamomi*, first discovered causing rot of cinnamon tree roots in Java in 1922, and for some time suspected of being the cause, was isolated from the soil of dead and dying jarrah forest and shown (in the following year) to be pathogenic to a wide range of native plants in the jarrah forest. Ground and aerial surveys were organised to determine the extent of the disease, and an intensive research program (in cooperation with the Forest Research Institute, various CSIRO Divisions and several universities) was conducted into the etiology of the fungus and its role in the ecology of the jarrah forest. To try to contain the disease and prevent its spread as a result of the artificial movement of soil from infected to infection-free areas, special management prescriptions were introduced. The threat the disease posed to all the values of the forest was readily apparent.

Interpretation of black and white aerial photos of the jarrah forest over the next few years began to establish the extent of the infection, and photos taken during the previous twenty years gave some indication of its rate of spread. In 1969, draft proposals for various forms of logging and for general forest hygiene, aimed at containing the infection, were submitted to the timber industry, seeking its cooperation, and by 1971 a hygiene program was in operation. In an effort to gain the public's cooperation, a booklet describing the disease, the organism responsible for it, the threat it posed and the Department's efforts to contain it was distributed widely. At the end of 1973, a departmental task-force was appointed to review both the

findings of a decade's intensive research into the disease and its effects and the operational practices which had been designed to restrict its spread. By that time the whole of the forest under the Department's control, nearly 2 million ha, had been mapped into 'dieback risk' categories. About 10 per cent was infected or suspected, about 15 per cent thought not to be protectable, about 55 per cent thought to be protectable, and 20 per cent resistant. This was encouraging information, particularly in view of earlier concerns. It also appeared that, though the pathogen was probably present in the karri, wandoo and tuart forests, its impact there was not significant. In toto, it seemed that about three-quarters of the forest was protectable or resistant. However this was no reason for complacency, for it was estimated that there were more than another 100,000 ha of infection or possible infection within national parks, other crown land and private property.

For the hygiene program to be effective, accurate maps of the occurrence of the disease were essential. However, it was clear from years of casual observations and deliberate field inspections that visual symptoms (even the death of highly susceptible *Banksia* species, which provided a fairly good early warning system) might lag months and even years behind actual infection. The answer to this problem was a quarantine program which would allow sufficient time free of possible infection from vehicles for symptoms of natural infection to become visible. The government agreed to such a program, and in August 1974 the Forests Act was amended accordingly. Because of the effect these proposals would have on some other departments, on members of various organisations and on the general public, the Department delayed the implementation of the proposals to allow time for appropriate consultation. Then, in January 1976, an area of 500,000 ha in the northern region was declared a risk area and placed under quarantine. This restricted vehicular access to certain routes and to essential services only and under a permit from the Department which specified conditions of entry, route and the washing down of vehicles.[72] In December 1977 a further 200,000 ha in the southern region were placed under quarantine, bringing the total area controlled by the regulations to more than 700,000 ha, a third of the state forest.[73] Implementing and monitoring the regulations involved a great amount of work in sign-posting roads and forest boundaries, in erecting gates, in providing vehicle wash-down facilities, and in coordinating aircraft and ground patrols by night as well as day. It also involved continuous public relations since it was the Department's aim to achieve the quarantine by education and cooperation rather than through prosecution.

Compiling accurate maps of the diseased areas also posed a problem. Black and white aerial photos gave satisfactory definition of the worst affected areas but not of small individual infections. This problem was

solved with the use of large-scale 70 mm special colour photography, which was first tried in 1967 but did not realise its full potential until 1978 when a microwave aerial navigation system was developed. This allowed the aeroplane carrying out the photography to be flown within a few metres of a predetermined flight path and consequently provided much more accurate mapping.

The effects of dieback placed a considerable strain on the Department. Not only did it have to cope with this new problem but it also had to try to meet, in the presence of the disease, the same obligations it would have met in its absence. As well as the mapping, research and quarantine programs connected with dieback, extra ingenuity was called for on the part of the Department to keep to a minimum the necessary modifications in respect of harvesting, engineering works, litter-reduction burning, and many facets of its multiple-use management programs.

Mining

Deep mining within the forest has been practised to a small extent in Western Australia for more than sixty years. Until the early 1960s, surface mining was restricted to minor mineral-sand operations, tin mining and gravel extraction. With the great expansion of interest in bauxite mining for alumina in Australia at that time, the laterites of the jarrah forest were an obvious target, and in 1961 the government agreed to allow open-cut mining in the forest at Jarrahdale. Operations commenced in 1965, with an estimated future clearing of about 8–14 ha per year.[74] Within ten years, that operation had grown to 110 ha per year, and the company operating at Jarrahdale anticipated another operation in the area in the following year. Government agreement with another company extended over an area of nearly 200,000 ha. Thus the area of state forest under mineral lease and claim represented more than half of its total.[75]

When a Committee of Inquiry into the Mining Act was set up in 1970, the Department took the opportunity to express its concern about the effects of open-cut mining and to offer firm recommendations for its control. If implemented, these recommendations would have prevented open-cut mining of the forest unless a permit was obtained from the Minister responsible for forestry; and the permit would be subject to special conditions. There were several reasons for this submission. Broad-scale clearing frequently led to salination of water catchments, and practically all the water catchments were in state forests covered by bauxite mining leases. There was already an annual reduction in the amount of dedicated forest in the order of 500 ha a year for reservoirs, powerlines, pipelines, roads, etc. which was by and large unavoidable. Increasing the loss of state forest by mining (particularly the prime forest sites which were especially attractive to the mining industry because they carried the higher

grades of bauxite) was, however, questionable given the loss of other values and products of the forest and given the sources of bauxite further north outside the forest. Attempts at restoration or rehabilitation of the mined areas had been expensive and had not been very successful because of the shallow and infertile nature of the replaced soil and the heavy clay, compacted by the action of the mining machinery, now beneath it. Almost certainly, therefore, it would be a very long time before it was jarrah forest again — if ever.

The Department was also very concerned about the spread of jarrah dieback. Investigations had clearly demonstrated that, although the disease was spread fairly rapidly downhill by waterborne spores from an initial infection, the major spread of the initial infection was caused by artificial movement of infected soil, especially by vehicles. Bauxite mining involved soil and vehicle movement on a massive scale, and mining exploration was also a potential contributor to the wide spread of infection.

The committee recognised the validity of the Department's concerns, and the government placed a temporary ban on prospecting over state forests and timber reserves. For the most part, this prevented an increase in the million hectares already under either lease or claim.[76] Meanwhile, the Department, in conjunction with the mining companies and with the cooperation of other government organisations, continued to experiment with various methods of rehabilitating the mined sites and with the establishment of a wide range of *Phytophthora*-tolerant shrubs and trees, local and exotic, for a quick cover to control erosion, prevent water pollution and re-establish a forest environment.

Coniferous Afforestation

Western Australia, unlike the eastern states, had no native soft timbers in commercial quantities, and one of the first tasks of the first Conservator at the turn of this century was to try 'to form plantations of some of the softwoods of commerce and thus to a certain extent make the Colony independent of outside supplies which are daily increasing'[77] — a policy which the forest service has maintained since that time. The first plantations of pines and wattle 'upon the seaside commonage near Bunbury' in 1897 were not successful, and it took forty years of research before it was found that *Pinus pinaster* (pinaster pine, cluster pine, maritime pine) would grow better on the coastal sands than anything else. Although *Pinus radiata* often gave early promise on the coastal sands, it did not develop there; it needed better soils, and on those soils it grew better than anything else.

Backed by the successive interstate forestry conferences, which had made national coniferous afforestation a major aim, Kessell, as the new Conservator, stepped up the planting program in 1921 and was personally involved in the research which showed that the

solution to obtaining sufficient planting stock in the many scattered nurseries that were established for the expanded program was to inoculate the sites with appropriate mycorrhiza. By the early 1930s, as in the other states, many of the plantations were obviously unsatisfactory and research into suspected nutrient deficiencies was begun. This research featured the first statistically designed experiments to be set up in forestry in Australia. In Western Australia, as elsewhere, it was found that the addition of phosphate to the coastal sands gave good results (most Australian soils being deficient in it), and on certain soil types the provision of even small quantities of zinc brought spectacular results. Stoate was closely associated with Kessell in the early investigations and, throughout his term as Conservator and in his retirement, he continued his interest in this research. By the end of the 1930s, most of the basic problems associated with the establishment of pinaster and radiata pine plantations had been solved. About 5000 ha had been established, and, with an annual planting of 400 ha, the plantation program seemed to be well on a successful way. Then came the war years. With limited staff and reduced finance, the program stopped, for all practical purposes, for the next ten years.

In 1949, a special allocation of loan funds was made by the government to start a new program and, in keeping with the formulation and progressive review of a working plan for the native forest which Lane Poole had inaugurated, a Pine Working Plan was prepared.[78] Although difficulty in obtaining suitable land was anticipated, it prescribed an immediate annual target of 400 ha, rising to 2000 ha, with an ultimate target of 80,000 ha. With his appointment as Conservator in October 1953, Harris slowed the tempo of planting in order to have a critical, economic look at the land available for planting pine, and a drive was also made to find land in the south-west suitable for fast growth of radiata pine. As there was very little of appropriate quality in the reserved forest, a policy of purchasing degraded agricultural land was instituted, and between 1953 and 1965 about 7000 ha were obtained.[79]

The Pine Working Plan was revised in 1956. It affirmed the total target of 80,000 ha and also the annual program of 800 ha, though only because of the limited loan funds available. The Department favoured radiata pine, but there was considerable competition for land suitable for it. The government had recommended planting large areas of pinaster pine as close to Perth as practicable, but because of a shortage of suitable land there the Department began to consider a large, undeveloped area of banksia flats and sandhills on the coastal plain to the north. Little was known about the climate, soils and vegetation of this area, and to test its suitability for pine eighty experimental plots (ranging from less than one to more than 40 ha) were established in 1956–57.[80] At the same time, site quality (pro-

ductivity index) mapping of the established plantations was begun (based on the South Australian system). The program also benefited from the increased use of mechanised equipment in clearing, site preparation and planting and from the use of weedicides in both nurseries and plantations. By 1965, nearly 18,000 ha (about 40 per cent radiata and 60 per cent pinaster pine) had been planted.

In 1957, a program in tree-breeding was initiated and material from the local plantations, the eastern states and New Zealand was selected to improve the form, vigour and wood properties of radiata pine. By this time, several distinct provenances of pinaster pine, whose origins could be traced through records of seed supply going back to the 1890s, were recognisable. Their original localities stretched from south-west France, through Portugal to Corsica. A comparison of their growth habits, growth rates and wood properties showed that the provenance from the Leiria forest in Portugal (also the chief planting stock there) was superior to the others. In 1963 D. H. Perry, who had been associated with the afforestation program, and pinaster pine in particular, for many years, went to Portugal. He spent two years there obtaining breeding material, which, brought back to Australia, along with selections from the local plantations, have formed the basis of an intensive and very successful breeding program ever since.

With the passing of the Softwood Forestry Agreement Act in 1967, the Department looked to doubling its recent annual planting rate of 1200 ha and lifted its total target to 96,000 ha. During 1966–68, J. J. Havel developed a method for assessing the potential of the northern coastal plain for pinaster pine on the basis of ecological indexes with the help of information from the experimental plots which had been established there ten years earlier.[81] With ground survey and air photo interpretation, it was applied to the area north of Perth with considerable success. It was less successful when applied to the 'northern jarrah' area south of Perth, probably because of more complex environmental factors.[82]

Although there was plenty of land for pinaster pine, its productivity was only about a third that of radiata pine growing on suitable sites and the Department was naturally keen to see as much of the increase in its total planting target in the latter. The area best suited to concentrated planting to support large integrated industry was the valley of the Blackwood River, in the vicinity of Nannup, where 10,000 ha of suitable land had been purchased since 1955 and was rapidly being planted, and where another 6000 ha of suitable land was available for purchase. Whereas many other river valleys that might be suitable for radiata pine were being converted to reservoirs to increase water supply, the headwaters of the Blackwood were already brackish and it was unlikely to be dammed.[83] In his annual report for 1970, therefore, the Conservator made a strong appeal to Parliament

to formulate a policy of progressive land purchase in the Blackwood Valley and to provide funds for it. Certainly the Department had proved its capacity to increase planting given the funds; in the first five years of the Softwood Agreement it had planted more than double the 5000 ha planted in the previous five years.

Whereas previously the Department had merely pressed for an expanded softwood planting program to support the hardwood forests in providing wood for the future, by 1972, for the third revision of its General Working Plan for Pine (and very likely in line with the national aim of self-sufficiency being proposed for the approaching FORWOOD Conference), the Department began arguing strongly for a policy of 'net self-sufficiency in timber and wood products for the future'.[84] It conceded that there would always be a need to import some specialty timbers and wood products and that there would be a case for continued export of specialty hardwoods. These should balance; otherwise the great amount of the state's needs should be provided by local timber and wood products. Based on forecasts of the state's population and its wood requirements for the year 2000, the area of pine plantation now looked as if it should be somewhere between 120,000 and 160,000 ha, depending on the relative proportions of radiata and pinaster pine. Of the present total of 30,000 ha, the former formed 40 per cent. To raise this proportion desirably to 50 per cent of a minimum total of 120,000 ha would mean increasing the annual rate of 2400 ha to a rate for the period 1976–2000 of 3200 ha (1700 of radiata and 1500 of pinaster pine). Research was under way to find methods of improving poor soils to extend the range of radiata pine.

Along with these views on policy, the Department took the opportunity to announce radically new silvicultural prescriptions for the plantations. The occurrence of several summer droughts had brought home the point that, on many sites, early heavy thinning was necessary to avoid deaths from water stress; and the improvements from the tree-breeding program allowed much wider initial spacing in establishment. As a result, the new 'Prescription 70' essentially involved heavy early thinning to promote growth on the high-pruned final crop trees, shortening the rotation of radiata pine from forty to thirty years and the rotation of pinaster pine from sixty and forty years, and reversing the 70:30 ratio of small to large sizes expected under the previous prescriptions.

It was a major premise of the Department's argument for self-sufficiency in 1972 that future wood imports would be scarcer and more expensive. Within the next twelve months its arguments received strong support when difficulties were experienced in obtaining joinery timber from traditional overseas suppliers and prices rose sharply.[85] On the other hand, it was not having much luck with its Blackwood Valley proposals. An upturn in agriculture had resulted in

a number of previous offers of private land being withdrawn and, because of the high prices being demanded by landholders, the Department had been able to purchase only one small property of 150 ha. To keep to its program, it needed nearly ten times that much each year. It might be forced to consider the jarrah areas in its state forests that were both affected by dieback and deficient in soil nutrients as an alternative. By the following year it had reconciled itself to doing this for several reasons. Estimates of future yield from the native forest made for the 1974 FORWOOD Conference showed a drastic reduction on previous estimates. These lower estimates resulted from less optimistic estimation of marketable sawlog volume and reduction of the commercial forest resource owing to a number of causes — conservation priorities, public utilities, mining and jarrah dieback. To meet a target of self-sufficiency would mean lifting the annual planting rate even further, from the current 2400 ha to 4000 ha. The area of land needed to do this was available in the large area of diseased jarrah state forest between Collie and Busselton in the region known as the Donnybrook Sunkland. Although the quality of the soil was poor, the rainfall was adequate and the results of research into drainage and nutritional problems were promising, and both radiata and pinaster pine appeared reasonably resistant to *Phytophthora*.[86]

In July 1975, the Department issued a large, comprehensive, well-illustrated document, 'Afforestation with pines in the Donnybrook Sunkland: statement of intent', in which it presented its case for zoning this area for various uses, explained the effects of these uses on attendant environmental and social factors, and outlined ways of preventing any deleterious effects on these. It circulated the document to a large number of State and Local Government agencies, other interested organisations and private conservation groups likely to be involved with or affected by this extensive land-use development, and invited comments from them. The document was also made available to the general public.

The area under consideration was composed of 258,000 ha of state forest, 12,500 ha of timber reserve and 12,500 ha of other crown land. Use of the area in the past had been almost entirely restricted to scattered harvesting of jarrah. Very little had been alienated for agriculture because of its lack of fertility and, though the application of modern artificial fertilisers had made it marginally attractive for agriculture, there was a considerable amount of better unused alienated land in the region for the purpose. There were no special features of geological or historical interest and what there was of scenic value in the area was ear-marked for special reservation. The Department proposed retaining 190,000 ha of the area as native forest, under the present type of multiple-use management converting 60,000 ha to pine plantations (arranged as small cells in a matrix

of native forest) during a period of thirty years, and making 33,000 ha into recreation, flora and fauna, and other special kinds of reserves. The only effects it saw on the hydrology of the area were beneficial ones resulting from the restoration of tree cover lost by dieback. The only flora and fauna of special interest would be catered for in the reserved areas. Any recreation or scenic values were well catered for by the special reserves. The increase in forestry activity would stabilise the present forestry work-force, create potential seasonal employment for local agricultural workers, and provide future opportunity for a large, integrated, decentralised, forest-based industry.

On 4 April 1978, a tropical cyclone on a much more southerly path than usual (code named 'Alby' by the Commonwealth Meteorological Bureau) swept through the south-west of the state. Included in the damage done by the gale force winds was the razing or near-razing of 900 ha of well-established plantation (much of it recently thinned) and more than 300 ha were burnt by associated wildfires. Only a small proportion of the wood could be salvaged.[87] The burnt areas were replanted the following year and the wind-damaged areas the year after that.

Pulpwood and Woodchips

In his annual report of 1960, the Conservator took the opportunity to draw the attention of Parliament to the great waste of forest material in the state, in particular, the material of trees from which logs had been taken for timber production, trees whose properties, growth habits or location rendered them useless for conversion to timber, and trees that could be thinned in a stand to enhance the growth of their better neighbours. He anticipated that eventually there would be a pulpwood industry in Western Australia and that marri (*E. calophylla*) would be the main source of raw material.

Marri is one of the most widely distributed eucalypts in the south-west. Although it is a big tree and the properties of its wood are in many ways equal, or even superior, to those of jarrah and karri, which are the favoured species for timber production, the prevalence of gum veins and loose rings has made it generally unpopular as a saw timber. On the other hand, it is not susceptible to the fibre breakdown and decay in its heart which characterises so many other eucalypts and so is a very economic tree for pulping. Tests carried out in the early pulping investigations in Australia had shown it quite suitable for kraft papers, container boards and hardboard.

In 1967, Japanese wood buyers were showing interest in Western Australian eucalypts along with the eucalypts of the eastern states. The Department's view was that this interest should be encouraged. It was not optimistic about the chances of a papermaking industry being established in the state in the near future and thought the production and export of chips from sawmill waste and species

presently unmarketable for timber offered a good opportunity for improving the utilisation of the wood resource. Accordingly, a feasibility study into supply was begun.[88] By late 1967, the Japanese interests had reported favourably on marri, jarrah and karri as raw material for their paper industry and in December the government called for proposals for the production of upwards of 500,000 tonnes of woodchips per annum from state forests.[89] Six proposals were received. In October 1968, Bunnings Timber Holdings Ltd were granted rights to establish a woodchip plant near Manjimup, and in June 1969 the government signed an agreement with W. A. Chip and Pulp Company Ltd and Bunnings Timber Holdings Ltd to establish the industry, with Bunbury as the export harbour. In the previous September the Commonwealth Government had announced its intention to control the export of material for pulp production through its control of export licences.[90]

The agreement proposed that nearly 700,000 tonnes green weight of chips would be exported annually for fifteen years by utilising logs unsuitable for sawmilling (mostly of marri and karri, from trees removed for regeneration purposes), sawmill waste and thinnings. Although jarrah was included in the licence, it was not currently favoured for pulping. The material would be drawn, in conjunction with the harvesting of sawlogs, from a licence area of almost 500,000 ha centred on Manjimup–Pemberton.

In its environmental impact statement on the agreement proposals, which it published in 1973, the Department outlined its plan of operations. The woodchips would come from an area of about 11,000 ha cut over each year for sawlogs, using a forest block (a named area with defined natural or artificial boundaries and ranging from 4000 to 6000 ha) as the basic administrative unit. Within each block there would be coupes (cutting areas), the size of which would depend on the forest type, the number of operators and various silvicultural and environmental considerations, but with a maximum area of 800 ha in the jarrah–marri forest (which would be cut selectively) and 200 ha in the karri–marri forest (which would be clear-felled). Because the project was so large, because the pulpwood industry had attracted considerable adverse publicity in other states, and because the area was of considerable social importance and environmental complexity, the Department was at pains to list the impact the operations would have on the environment and to outline the extent to which it could safeguard against any adverse effects. The company received approval to export chips from the Commonwealth Government in 1973 and the production of chips at Manjimup began in September 1975.

In the Department's view, experience here and in similar forests further north suggested that there would be little risk to water quality in the Manjimup sector of the licence area but that there could

be salt problems in the north-east sector. As a result, in October 1973, the government (through the Environment Protection Authority) formed a Technical Steering Committee to monitor the water supply, identify salt-sensitive areas and provide the Department with data to plan the management of the area appropriately. The committee began fieldwork in 1975. Progressive monitoring to the end of 1979 showed that the effect of the woodchip operations on the region's water resource was not a cause for any concern. However, the committee did emphasise precautions regarding wet-weather logging and logging operations in certain areas of high salt risk.[91]

Land Use and Forest Multiple Use

Although Western Australia represents a third of the continent, only a very small portion of it is suitable for reasonably dense settlement and that portion is the extreme south-west. Perth, the capital, which is situated within this area, is more than 3000 km from the capitals of the eastern states and from Canberra, the national capital. It lies a similar distance from the nearest Asian city, is even further from its nearest neighbours to the west, and lacks any neighbours at all to the south. Thus it is one of the most isolated capitals in the world. This sense of geographical isolation in an otherwise harsh but abundantly mineral-rich topography has led in recent years to an intense commitment to self-development toward a goal of state prosperity. This commitment has brought considerable competition for land in the south-west (and the inevitable conflicts that arise from such competition) even to the extent that it may in the long term, through deleterious effects on the supply of water, put its future seriously in jeopardy. Effective land use is therefore very important in the south-west of Western Australia and, as one of the largest landowners in that area, with a resource of tremendous environmental importance, the Forests Department is vitally involved in it.

In 1958, partly as a natural response to its charter, partly influenced by growing international concern for the environment, and partly prompted by the effects of a resources boom, particularly in Western Australia, the recently formed Australian Academy of Science, based in Canberra, appointed a committee to obtain information that might assist in planning a national system of national parks and nature reserves. Sub-committees were formed in each of the states to investigate what had been done in this regard up to the present and to suggest what might be done in the future. The Western Australian sub-committee's report of 1962 included recommendations for the dedication of permanent reserves representing the major ecosystems and types of scenery and some, though not all, of these were implemented by the government.

In 1969 the government appointed a Reserves Advisory Council with terms of reference similar to those which the Academy commit-

tee had set for itself and, during the next two years, several recommendations made by the Council regarding reservations were implemented by the government. In 1971 the government passed the Environment Protection Act, which established an Environmental Protection Authority (EPA) to, inter alia, 'consider and initiate the means of enhancing the quality of the environment'. The Authority considered that one essential means to this end was the establishment of an appropriate system of reserves and early in 1972 it set up a Conservation Through Reserves Committee (CTRC) with several terms of reference, one of which was to review and update the Academy of Science sub-committee's report and recommendations.

The CTRC presented its first report in August 1974.[92] As a framework for its considerations, it had divided the state into twelve areas which it called 'systems', each representing a natural and demographic entity. It proposed the reservation of areas within these systems according to a set of criteria — unique or spectacular features, the extent of areas of a similar kind, relative location of such areas, the competition for use and conflicts that were likely to arise because of reservation, and so on. The committee made a number of recommendations for reservations within ten of the twelve systems (1 to 5 and 8 to 12). It deferred recommendations for System 6, the most populous area (stretching from Perth south to Bunbury, from the coast to about 80 km inland, including the Darling Range) because the complexity of the presently competing demands required more time for consideration. It also deferred consideration of System 7 in the far north of the state (the Kimberley region) for want of adequate data. Systems 1, 2 and 4 included state forests and, in recommending reservations within them, the committee drew attention to the 'great expertise in all aspects of forest management' which the Forests Department had and suggested that the government should take advantage of this in the management of forested areas for whatever purpose they were reserved. It recommended that, for example, the Forests Act be amended to allow reservations in state forests for the conservation of flora and fauna, and for recreation, and that the management of these be left to the Department. It saw some forest areas being managed by the Department under the designation of 'Forest Parks' as if they were to all intents and purposes declared national parks.

In 1976, small but significant amendments to the Forest Act set the seal of government approval on the policy of multiple use that the Department had been evolving informally for some time. In the atmosphere of increasing interest in land use in Western Australia, and conscious of the short breathing space the Department might have before it became a target for environmental criticism, like its fellows in the eastern states, the Conservator had emphasised in his annual report in 1970 the Department's long-standing role in water

production, conservation of flora and fauna, and forest recreation as well as wood production. The report carried the message that 'managed forests have done more for conservation than any other form of land use in Australia'.

The Department's modern role in the planning and implementation of multiple use took firm shape in the early 1970s when it expanded its concept of priority use, originally applied in the jarrah forest by the allocation of high-quality areas for management for maximum wood production ('intensive management units'), to include uses other than wood production. In 1973, the Department set aside an area of about 40,000 ha between the Perup and Tane Rivers (to the east of Manjimup) as the Perup Fauna Priority Area within the state forest to protect viable populations of rare mammals facing extinction elsewhere.[93] This was followed by the setting aside of other areas to preserve forest communities that were becoming rare as a result of agricultural development, including Dryandra (mallets, wandoo and rare fauna), Ludlow (tuart) and Boranup (karri and soils derived from limestone).

In the mid-1970s, the CTRC proposed the reservation of the Shannon River basin, most of which was state forest, to ensure the biological preservation of the karri forest community. The Department opposed this proposal on the basis that it was inferior to its own approach, then in the course of development, of setting aside a series of areas within state forests which not only encompassed the ecological variation known to occur in the karri forest but also included other important associations (such as those containing red tingle, yellow tingle and red flowering gum) and non-forest communities such as swamps, open plains and lithic complexes. Following the submission of these and other proposals to a Special Review Committee, the EPA came out in favour of the Department's approach despite strong opposition from the environmental movement.[94] The proposals were subsequently given the backing of the government by its approval in 1977 of a new General Working Plan (No. 86) which formed, in the Conservator's words, 'a milestone in the history of forestry in Western Australia'. Not only was the working plan based on a formal policy of multiple use for the first time, but the management objectives, and the strategies to achieve them, were for the first time made available for public scrutiny. This acceptance by the government of the concept of priorty areas for biological preservation within state forests was confirmed by its approval of their inclusion in General Working Plan No. 87 of 1982.

In the meantime, Havel's work in assessing the potential of the northern coastal plain for pinaster pine had demonstrated the value of ecological classification in determining land use potential and, in the early 1970s, his work was extended to allow an assessment of the potential of the 'northern jarrah forest' (an area of about 750,000 ha

from Mundaring south to Harvey) for a wide range of uses.[95] The basis of planning became the division of the forest into 'management priority areas', the priority for each area being determined by the potential of the site for each value (water, wood, recreation, conservation of flora and fauna, scientific study, education, minor forest products), the estimated level of demand, legislative and economic constraints, intercompatibility of uses, and the requirements for protection.[96] Each management priority area would be described according to the dominant use nominated for it. For practical management purposes, these areas would be regrouped as 'management groups (zones, categories)' based primarily on climate and geomorphology, and the management groups themselves would be aggregated according to the predominant land use.

To illustrate the principle to the public, in 1977 the Department produced a document entitled 'A perspective for multiple use planning in the northern jarrah forest'. It was a very clear exposition of the Department's ideas on the most effective base on which to plan, implement and control multiple use management of what was the larger and better part of the state's jarrah forest. It described the environmental features, current resource use and forest management of the area, and the economic and legal constraints on planning, and outlined and rationalised the management strategy for the six management zones into which the area had been divided. This 'perspective' was followed in 1978 by 'Land use management program, northern jarrah forest, management priority areas', outlining the planning in more detail, which was circulated to a number of other State and Commonwealth Government agencies and organisations for comment. It was suitably amended and published in 1980. Meanwhile, similar draft land-use management plans were being prepared for the central and southern forest regions. The ecological classification was used to select sample areas within the state forests for biological preservation and led to the acceptance by the government of a series of management priority areas for the conservation of flora, fauna and landscape. These priority areas complemented the reservations already made in the southern forests and both were listed in the 1977 General Working Plan and updated in the 1982 revision in which overall zoning for multiple use was introduced.

By late 1976, the recommendations which the CTRC had made in respect of Systems 1–5 and 8–12 in 1974 had been scrutinised, amendments had been suggested and the final recommendations of the EPA had been accepted by government. Of the remaining two, System 6 was proving by far the most difficult. This area (more than 2.5 million ha) contained Perth, Bunbury, the Swan Coastal Plain, the Darling Scarp and the Darling Plateau. Because of its physical features, natural resources and high population density it had the potential for more conflicts over land use than all the other systems

together. It also included the largest (and the best) area of jarrah forest, which represented almost 40 per cent of the land area of the system, and an even higher proportion of the land with native forest on it. The Forests Department, as a major land manager, thus had considerable responsibility to ensure that recommendations for the use of the forest were in accord with the philosophy of 'conservation through reserves'.

The 'management priority area' formed an ideal basis for these recommendations and, when the EPA began inviting submissions in late 1976 in what it described as '. . . an opportunity unique in Australia for an essentially urban population to comment upon the environment in which they desire to live and in which they desire to have their children live',[97] the Forests Department was in a ready position to make its submission. It recommended priority areas for conservation of flora, fauna and landscape representing 20 per cent of the forest area under its control. Most of these areas comprised central cores that were free from disease, surrounded by a buffer zone where some degree of human activity would be acceptable. They were also of a size and with boundaries providing as much potential protection as possible from fire and disease. The Conservator and the EPA agreed that the flora and fauna conservation priority areas should be denominated as 'Forest Parks' (as put forward by the CTRC in 1974). Legislation which the government had put in train in 1977 would require that any proposed change in the management planning of these areas would have to be considered by both Houses of Parliament. Because the term 'park' carried a connotation of recreation which might be in conflict with the prior purpose of conservation reserves, the term 'Forest Sanctuary' was under consideration.[98] Since recreation was a management objective throughout the forest, no management areas were specified with recreation as a priority.

As well as having a responsibility, as a major land manager in System 6, to submit its intentions of management to the EPA, the Department also had considerable knowledge of the area and expertise in managing the forest resources of it. It was therefore logical that it should be represented on the various committees which the EPA established to compile a data base, to delineate and describe proposed reserves, to assess the socio-economic impact of reservation and to reconcile conflicting land use demands. It made a significant contribution in mapping the vegetation of the area, and these maps, together with corresponding maps of the geology, geomorphology, pedology and land use by other agencies, provided an essential base for the whole project.[99]

Of all the forest uses in Western Australia, prior place goes to the production of water. In the government's declaration of a policy of multiple-use management in 1976, it listed as its first objective 'to protect, control and rehabilitate, where necessary, those forest areas

that contribute to the water supply requirements of the State'. This statement recognised two things. Firstly, although up to the mid-1960s there were few problems in supplying water of appropriate quality to the south-west of the state, including Perth, by the mid-1970s the situation had changed. Secondly, it recognised that the state forests contained the major catchment areas. The Department had, of course, been involved with catchment protection and rehabilitation since its foundation, and its conservation management strategies had gradually gained more and more acceptance as the deleterious effects of alternative strategies (such as the ringbarking program in the Mundaring catchment early in the century)[100] became only too apparent. But whereas in the past water was considered almost a by-product of the forests, and although supply was ensured if the management strategies for objectives such as wood production were sensibly planned and implemented, circumstances now demanded that management be planned around the supply of water of appropriate quality and quantity.

Two major factors are involved in this change of circumstances. One is the increased demand for water resulting from increased population and increased development; and at the present rate of increase, demand will come uncomfortably close to the water-production capacity of the area not too far into the next century — not far away, as water-engineering planning goes. The other is that the jarrah forest catchments, which provide so much of the metropolitan and country water (e.g. more than three-quarters of the metropolitan supply),[101] are characterised by very complex and fragile vegetation–soil–water relationships.

On what would normally be regarded as an inhospitable site for most vegetation, an ecologically complex forest has developed and maintains an equilibrium with a soil–water profile characterised in some places and at various depths by large accumulations of salts. If the forest cover is destroyed, naturally or artificially, at such places, this equilibrium is likely to be upset and salination of the streamflow may reach levels that are unacceptable to humans. Because it destroys so many of the major species of the jarrah forest, dieback disease poses a considerable and constant threat to this delicate equilibrium in sensitive areas; and so does the artificial removal of the trees by forest or mining operations unless reforestation is assured before salination takes place. These operations pose a double threat because they tend to enhance the spread of *Phytophthora*. Fortunately, these various operations, and the destruction of the forest cover by dieback disease, have not contributed significantly to salination so far because both have been concentrated in the western part of the jarrah forest and the heavier salt accumulations tend to occur in the eastern part. But this means that operations in the eastern part have to be planned and monitored very carefully and the spread of dieback

has to be contained. In addition, the western areas are subject to more pressure for recreation, and this puts added stress on the forest. To reconcile water production, wood production, mineral production, agricultural production and conservation of flora and fauna in a forest being attacked by a most destructive disease certainly presents 'one of the most challenging forest management problems in the world'.[102]

As elsewhere in Australia in the late 1960s, the demand for both passive and active forest recreation began to increase in Western Australia especially as much of the forest is fairly readily accessible from Perth; and, like forestry services elsewhere in Australia, the Forests Department moved to increase recreation as best it could without a formal mandate for doing so and without adequate funds. The inclusion of recreation as one of the multiple use objectives in 1976 provided an opportunity for some expansion; but limited funding and the need to control recreation on the catchments has restricted the Department to providing picnic facilities, self-guiding nature trails and marked bushwalking tracks. An outstanding example is the Bibbulmun track, which extends from Kalamunda (near Perth) some 500 km south to Northcliffe (near Pemberton), passing through some of the best forest scenery in the state.[103]

Because of their close involvement with land use and their expertise in a wide range of disciplines germane to it, departmental officers have been an obvious choice to serve on a range of committees set up by the government or its agencies to plan, advise on or monitor various aspects of land use. For the same reasons, many departmental foresters have a strongly developed professional sense of conservation which has prompted them to involve themselves in conservation issues in a private capacity. One example is the 'karri coast' proposal. Having agreed that a 120 km stretch of land along the south coast between Cape Beaufort and Walpole had special value for conservation and recreation, and was in danger of having these values diminished by unplanned piecemeal development, a group of foresters decided to assemble a case for its dedication as a national park. For most of its length the proposed park adjoins state forest, and the fact that one land use could complement the other presented an ambitious and exciting concept.

Completion of the case coincided fortuitously with the call by the CTRC for public submissions for conservation and recreation reserves in System 2, the area in question. The group decided to submit its proposal and to give it weight sought the support of the Institute of Foresters (WA Branch), the Forests Department, and the Australian Conservation Foundation (ACF). By mutual agreement the submission[104] became officially that of the Institute of Foresters (of which all the group were members) and support was readily given by the Forests Department and ACF. The CTRC adopted the report enthusiastically, and significantly expanded the area originally sought to

include further vacant crown land and other reserves. The CTRC recommendation was accepted almost without change by the EPA and in turn its recommendation was endorsed by the government in 1976. The process of dedication began shortly afterwards and by early 1982 approximately one-third of the total area of 100,000 ha had been proclaimed.[105]

Sandalwood

A history of forestry in Western Australia would be incomplete without some reference to sandalwood. Although it occurs elsewhere in Australia, it is most closely identified with Western Australia because of its long association with that state, beginning with the contribution it made to the colony's earliest sources of export income. The search for it helped pioneer the wheat and pastoral land of the southern interior and cutting it often provided an alternative income for struggling settlers. The sandal is a small tree which is found in India and some islands of the Pacific as well as in Australia. When the colony was first established, one species (*Santalum spicatum*) occurred over much of Western Australia, and another species (*Santalum lanceolatum*) was confined to the north. Because of widespread felling and difficulties in its regeneration, its occurrence now is very patchy. It is a parasite on the roots of host trees (frequently wattles in Western Australia). The heartwood of stem and roots contains an aromatic oil which has been used for centuries in India and China as a ceremonial incense, usually in the compressed powdered form known as joss sticks. Distilled from the wood, the oil is used as a fixative in the manufacture of perfumes and was for a long time used in the treatment of some venereal diseases until supplanted by other drugs. The wood is also used extensively for ornamental turnery.

As Dorothy Shineberg has described in detail,[106] a considerable trade in sandalwood from the Pacific through Sydney to China had developed by the time Perth and Fremantle were founded and several more years passed before the value of the tree they had been destroying in clearing, or using for fencing and firewood, was brought to the notice of the early settlers. Once the existence and value of the sandal was recognised in Western Australia, the government saw it as a source of badly needed export income. Restrictions were placed on its destruction, encouragement given to its felling, clearing and stacking, and moves were made to extract revenue for local use by licensing, taxes and tolls. From a small experimental shipment in 1845,[107] exports expanded to a value of £13,000 within three years. Twenty years later it had doubled and had a peak of £70,000 in 1874. By this time the government had come to appreciate the value of the industry to the state and had begun both to set aside reserves on

which sandal could only be cut on application and to consider ways in which the tree could be regenerated.

With the establishment of the Forests Department in 1896, greater areas were reserved, cutting came under stricter control, marketing became more organised and attempts to establish plantations were more successful. The main problem was to match a supply, which fluctuated inversely with the fortunes of land settlement and gold mining in Western Australia, with a demand which fluctuated according to influences and factors far removed from the state. The peculiar demands of World War I for sandalwood oil, for example, sent the value of exports soaring to £200,000 in 1920, some of which was for oil then distilled locally; and, despite capricious demand over the next few years, the export value rose to £300,000 in 1924.[108]

In 1929, the Sandalwood Act was passed and under it the existing exporting firms amalgamated to form the Australian Sandalwood Company, which, through the Sandalwood Export Committee formed in 1932, took over control of production and export. From the time of World War II, the quantities produced gradually diminished until in the 1960s they amounted to about 600 tonnes annually. By 1980 the amount had increased to about 1600 tonnes, much of it provided by crown land lessees attempting to cushion the effects of drought and a recession in the pastoral industry.[109]

CHAPTER 5
Victoria

Early Settlement

Victoria had a hesitant start. In January 1802, Lt. Murray discovered and explored Port Phillip and, in April of the same year, unaware of Murray's reports, Matthew Flinders explored it on his way from England to Australia and reported favourably to Governor King on its prospects for grazing and agriculture. As a result, Lt.-Col. Collins was commissioned to form a convict settlement there in 1803, but, after a year, because of the unsuitable site he had chosen and the reported hostility of the Aborigines in the area, he shifted it to Tasmania. Westernport had been discovered by Bass in 1798. Governor King was keen to establish a settlement in that area in 1804 but opinions of it were adverse. In 1826, the British Government instructed Governor Darling to form a settlement there prompted both by fears that the French would forestall it and by the favourable reports of the place from Hamilton Hume and Captain Hovell, who thought (erroneously) that they had ended their overland expedition of 1824 (which had started from Lake George in south-eastern New South Wales) in that locality. This settlement was abandoned as unsuitable in 1828.

The first permanent settlement took place at Portland Bay (already a semi-permanent base for whalers) when the Henty family, disappointed with the Swan River in Western Australia and unable to get a land grant in Tasmania, squatted there illegally with their flocks of sheep in 1834. They were followed the next year to Port Phillip by a group of squatters led by John Batman, whose presence without approval in what the British Government regarded as New South Wales was equally illegal despite his famous 'purchase' of the land from the local Aborigines by trade goods. To discourage similar illicit ventures in land dealing, the Government made Port Phillip a formal part of New South Wales, thus making its land regulations applicable there. But it was clear that enthusiastic reports of the fine grazing land in the south by explorers like Surveyor-General Mitchell, who journeyed down the Murray River in 1836, were a magnet to land-hungry settlers, and Governor Bourke established formal control in the area in the form of a government post at the present site of Melbourne at the end of that year. In less than ten years, all of what

was to become Victoria, except the north-west mallee country, had been invaded by squatters. By 1850, there were enough settlers and sheep for the British Government to recognise the claims of the colonists for independence. The colony was granted legal separation from New South Wales in 1851 and self-government in 1855.

Bushfires and Gold

Prophetically or not, independence was ushered in by a forest conflagration which set a standard of disaster that was not to be overtaken for nearly ninety years. Because of its geographical position, Victoria has a very dangerous fire-climate; and the composition and structure of many of the forest types makes them particularly fire hazardous. This combination has made wildfire a matter of outstanding significance in the state. After months of drought in 1850, many small fires burning over the sparsely settled forest country combined to cover what may have been as much as a quarter of the state in holocaust conditions on 'Black Thursday', 6 February 1851. Newspapers reported that visibility many miles out to sea was so reduced by smoke as to make navigation difficult and that ash fell in northern Tasmania, where lights were needed at midday.

Independence was also ushered in by a population explosion which brought with it almost as great an onslaught on the forests as the fires had. Gold was discovered in the Ballarat–Bendigo area in 1851 and, within a year, the population of the colony rose by more than 100,000. Six years later there were half a million people in the colony and the demand for wood for building, mining timbers and firewood was voracious. The colonial government, viewing wood as something that should be available at next-to-nothing cost for the large number of people battling to make a subsistence living from the earth, exerted only the lightest of controls in the form of annual licences to obtain timber for a modest sum, with no restrictions on species, sizes or quantity.

The extent to which the forest was being exploited, both legally and illegally, and the absence of any effective measures of conservation, were sufficiently serious for the Surveyor-General, the Assistant Commissioner of Lands and Survey and the Secretary for Mines, acting as a commission inquiring into applications for land, to send, in October 1865, a special report to the President of the Board of Lands and Works on 'The advisableness of establishing State Forests'.[1] They pointed out how the prosperity of gold mining was largely dependent on people getting timber from the native forest at very low cost and that, unless adequate reserves were proclaimed near the centres of the mining industry and the reckless waste was reduced, there would soon be no forest left to meet the increasing demand. They further suggested the establishment of plantations of indigenous and exotic species in a number of areas, not only for the supply of wood but for

other services as well. They suggested that the reserves were best vested in trustees who would advise the Board about the most appropriate rules and regulations and would exercise control over the implementation of them. As a result, a Board of Inquiry of six members, which included the three members of the commission and Ferdinand von Mueller (Director of the Botanic Gardens), was appointed in 1867 to consider how the various crown reserves might be made permanent and how the forests on them might be managed. The board submitted a very general report stressing the need for reserves and also recommending the establishment of softwood plantations.[2] A Land Act in 1869 included provision for the reservation of land specifically for timber production but with very limited security of tenure and mainly directed at ensuring future supply for the mining industry. In the same year, a special forest officer was appointed as 'overseer of forests and Crown land bailiff'.[3]

The First Conservator

In 1874, the Minister of Lands and Agriculture presented to Parliament a 'Paper relating to Forest Conservancy', which included a report on the forests of Victoria and considerable material on the use of forests, their reservation and their management in many parts of the world.[4] The report was scathing on the matter of the licence system still in operation — 'no more effectual method of legalising the destruction of timber could have been devised' — and it saw a total revenue of £4,000 for the year as being pitifully small in relation to the enormous amount of timber used and the even greater amount that was destroyed in obtaining it. As a result of the opposition on the part of alarmed citizens to the indiscriminate cutting, local forest boards had been established to oversee the management of the forests but had failed through a lack of funds and effective regulations. To replace them, a central board of three members for the whole colony was appointed in 1874. Legislation for local boards was again effected in 1876 but they continued to have very limited success. They did however generate so much pressure for reservation and conservation that, in the next fifteen years, a number of Bills specifically for forest legislation (in 1879, 1881, 1887 and 1892) were brought before the House — though none of them, for one reason and another, was enacted. Meanwhile, a continuing series of Land Acts were passed which included sections giving permanency to certain reserves for forestry purposes and temporary reservation to other areas against settlement until the forest was cropped.

At the urging of the Governor, who had served in the army in India and had seen there the results of forest management under the European foresters Brandis, Schlich and Ribbentrop,[5] the government in 1887 invited Conservator Vincent of the Indian Forest Service to inspect and report on the situation in Victoria. Although

his report was available to subsequent inquiries and was eventually tabled in the House in 1895, it was 'so frank and outspoken that it has never been published'.[6] The government's response was to appoint G. S. Perrin, who had seen several years' service in forestry in South Australia and Tasmania, as Conservator in 1888 with 'instructions to organise the work of a Forests Department' but with little else by the way of a forest policy and legislation to back it. Indeed it took six months before 'a suitable room was placed at the disposal of the branch' and then the Conservator had to share it with his clerical and drafting staff of three.[7] His first report in 1890, for the Forest Branch of the Department of Lands and Survey, was vigorous and comprehensive. He stressed the need for trained foresters and a school in Victoria to train them. Problems of fire protection particularly concerned him. There had been further devastating fires in the summer of 1886, which gave him an opportunity to draw attention to the problem and to suggest means of reducing the enormous destruction. He recommended placing state forests in the charge of intelligent foresters, stopping commonage on state forests, stopping indiscriminate camping on state forests and controlling the entrance of the public to them, amending the Fire Act regarding the use of fire on properties neighbouring state forests, and the formation of firebreaks — all obviously sensible, reasonable suggestions, which the government chose to ignore.

In 1895, the government invited Inspector-General Ribbentrop of the Indian Forest Service to inspect the forests and advise appropriate action. His report, like Vincent's, was frank, but unlike Vincent's it was printed.[8] He commended the people of the colony on their evident knowledge of the nature and distribution of the forest estate and their evident appreciation of its many uses but pointed out quite firmly that, in spite of that knowledge and appreciation, 'State forest conservancy and management are in an extraordinarily backward state.' In his view the forest laws were inadequate (whatever practical points they contained had been superseded by contradictory and mischievous circulars and orders); the effective area of inalienable forest reserves had not increased since Vincent's report; waste and destruction by fire were rampant; revenue from the forests was ridiculously small and the money spent on them was quite inadequate. The reasons for this were 'political and centre in the disregard of the general public weal where this clashes with the monetary profits of individuals and classes who can exert a direct Parliamentary influence'. He strongly recommended an Act to provide for inalienable state forests and for their rational and systematic management through the medium of working plans along the lines of those used by the Indian Forest Service. He thought it inconceivable that the '140,000 acres of Melbourne Water Supply area [where] the ground is covered with dead trees and other vegetable debris in all stages of

decomposition, and other dead and dying trees are ready to replace the fallen giants as fire and rot consumes them' should not be systematically protected and worked. He saw great merit in softwood afforestation though 'the broadcast introduction of *Pinus insignis* has no excuse whatever for, though it is doubtless one of the fastest growing pines, its wood is of a low character'. He also took the opportunity for a patriotic tribute to 'your eminent scientist, Baron Ferdinand von Mueller who as far back as 1871 . . . recommended the rational treatment of the Victorian forests'.

The Royal Commission of 1897

For the government to invite Ribbentrop's advice was one thing; to take it was another. But at least his report was a catalyst for the Royal Commission which was becoming more and more inevitable. It was as assiduous a Royal Commission as forestry in Australia has ever had. Issued in June 1897, it did not commence its functions until early 1898; but, in the next three years, this group of eleven members of Parliament submitted fourteen voluminous reports. The first thirteen contained detailed descriptions and considerations of the major forest areas of the colony; the fourteenth carried a summary of forestry in a number of other countries and an extremely keen assessment of the situation in Victoria, the causes of this situation and solutions to it.[9] 'We have endeavoured,' said the commissioners 'to awaken the public to a due sense of the danger of pursuing . . . an impoverished and short sighted course in regard to forest conservation and trust that a national policy in the matter will now be adopted'.

As others had done before them, the members of the commission saw the need for the fundamentals of forestry — legislation, policy, funds and staff — and they expressed themselves on this need, and the shortsightedness of not meeting it, with engaging frankness. The commissioners needed no special persuasion of the problems of wildfires which raged in the early days of their sittings. Six successive days of 30°C in the previous November and 42°C at Christmas were a pointer to 'Red Tuesday', 1 February 1898:

> when a holocaust devastated thousands of square miles of country, killed at least 12 people and deprived more than 1500 families of their homes . . . [and when] even the most important citizens discarded frock coats and toppers, donned pith helmets and tucked silk handkerchiefs inside their stiff collars.[10]

The Forests Act 1907 and a Forests Department

The forces of opposition to change were strong enough to hold the status quo for a few more years. The commission's final report, 'that classic of Australian forestry . . . far beyond the usual dry-as-dust official Blue Book . . . the beginning of forest literature for Australia

[with] an enduring historic value', lay 'pigeon-holed and neglected'.[11] But pressure on Parliament from both inside and outside for a rational policy was eventually such that at last, after forty years of inquiries, commissions, advisers and unenacted bills, the government brought down the Forests Act of 1907 (which came into operation on 1 January 1908); and, in February 1908, a State Forests Department under a Minister of Forests came into being, constituted as provided by Section 5 of the Act. The Act provided for the appointment of a Conservator to head the Department and appropriate supporting staff; for the dedication of permanently reserved forest and provision for further dedications; for control of forest produce on unoccupied crown land; and for the collection of royalties.

H. R. Mackay took up duty as Conservator in May 1908.[12] Previously a Senior Inspector, he had been Secretary to the Royal Commission of 1897, had compiled its reports and had drafted the Bill on which the 1907 Act was based.[13] The Chief Clerk was A. W. Crooke, who had been appointed to assist Perrin. He had acted as Conservator (in the Department of Mines and Forests) for a short time (1905–07) during the period between Perrin's death in December 1900 and the creation of the new department. His reports, a model of plain prose and plain speaking, form an excellent unvarnished record of the situation at the time.

The next ten years saw a steady increase in the out-turn from the forest, considerable improvement work on the native forest, which had suffered so much from indiscriminate cutting, the establishment of both hardwood and softwood plantations, and improved fire protection. The School of Forestry at Creswick was opened in October 1910 and commenced producing technically trained officers for the new service. D. E. Hutchins waxed enthusiastic about Victoria at this stage. By contrast with other states, he saw in Victoria that:

> happily the history of forestry in Australia [had] another and a brighter side . . . the initiation of a working Forest Department on 1 January 1908 . . . is a red letter day in the history of Australia. The next generation may make it a flower festival. It marks the dawn of happier days for the outraged country side.[14]

The Forests Act 1918 and a Forests Commission

In December 1918, a much more comprehensive Forests Act was passed. (The present legislation is based on this Act.) Under it, a Forests Commission of three came into being on 1 October 1919 with Owen Jones (a thirty-two-year-old graduate of the Oxford forestry course with practical experience in the Forests Department of Ceylon and war service in the Royal Air Force) as Chairman, H. R. Mackay and W. J. Code as Commissioners, and A. V. Galbraith as Secretary. The Act provided for the establishment of a Forestry Fund of a fixed

sum of £40,000 per year, together with half of any gross revenue over £80,000, for the improvement and reforestation of the state forests. It also authorised the Commission to recruit, employ and manage its staff.[15] The provision of the fund was the most important element of the new legislation. For the first time, a policy could be formulated with some hope of its implementation and the Commission set it out in simple terms which continue to form the basis of policy today; namely, to protect, conserve and develop the indigenous forest, and to create and maintain an adequate area of softwoods.

The first act of the new Commission, as a basis for its policy, was to survey the world scene. This, however, was little more than a formality for the Commission had little doubt that no time should be lost putting Victoria's forest house in order through the protection and systematic management of the hardwood forests with which it had been blessed in some abundance, and in establishing plantations of softwoods, with which it had not been blessed at all. There were many problems in regard to the native forest. The major one was protecting it from fire. The main silvicultural problems were a preponderance of mature and overmature trees in the mountain forests and the difficulty of getting regeneration in the foothill and plain forests. But the biggest problem was that Victoria had insufficient forest area reserved for wood production for the future. Both Jones and Mackay attended the fifth Interstate Conference on Forestry at Hobart in April 1920 and came back stressing to Parliament the need for Victoria to increase its reservations to 2.2 million ha, the quota allotted to Victoria of the total area of 9.8 million ha which the conference saw as necessary for Australia as a whole. It was many years before Victoria's quota was realised.

Mackay retired in September 1924, his place as a Commissioner being taken by A. V. Galbraith. On Jones' resignation in December 1925, Code became Chairman. When Code retired in 1927, Galbraith became Chairman and continued in that position until he died in 1949. The Commission took the opportunity in its 1928–29 annual report to review activities since its inauguration in 1919. The main principles of the policy of the 1918 Act had been adhered to; that is:

> the conservation, development and utilisation of the indigenous forests based on sound forestry principles; the establishment of adequate plantations of exotic softwood species; the prosecution of essential research work covering the natural products of the forests.

This had been made easier by a supplementary loan of £500,000 in 1925 for a five-year program of development work, most of which had been aimed at fire protection and repairing the damage of the past 'reckless and ill-advised exploitation of the native forests', at working from the information of forest inventories toward a sustained yield,

and at the continued establishment of softwood plantations towards a total of 80,000 ha.

Galbraith's twenty years as Chairman (with W. W. Gay, D. Ingle, T. W. Newton, A. A. Hone and F. G. Gerraty as Commissioners at various times during the period) covered a momentous phase in the evolution of the service, characterised as it was by the economic depression of the late 1920s, the worst fires in the Department's history in the late 1930s, the World War of the 1940s and the civil rehabilitation period which followed it. During the first decade considerable effort was put into the compilation of European-style management (working) plans for much of the indigenous forest and for the softwood plantations. The Forestry Fund was reduced to some extent during the economic depression but considerable work was carried out as unemployment relief measures with special funds. There was a gradual expansion of the pine planting program with a transfer of effort from the old mining areas and low-grade sandy or swampy coastal areas (all that was originally available to the Commission) to better country in the Otways and in the north-east. In June 1939, the government created a Department of State Forests with the Chairman of the Commission as its permanent head and transferred responsibility for staffing from the Commission to the Public Service.

The devastation of the forest by fire earlier in the same year was such that, for the next year or two, a great part of the energy of the Department was directed toward salvaging as much as possible of the burnt ash-type eucalypt resource of the mountains in the east-central part of the state. But even this enormous project had to take its place in the numerous problems of the 1939–45 war period which the Commission was to report, at its end, had brought a few advantages but mostly disadvantages. It was true, the commission said, that, because of the great demand for wood and the cessation of imports, large quantities of relatively low-grade and small timber had been used, indigenous timber had replaced certain traditional imports and the salvage of the burnt ash-type resource had been accelerated. On the other hand, the more accessible stands had been heavily drained and future supply would have to come from further out, thus necessitating an extensive road-construction program. Fire protection, which had previously had a high priority, had been comparatively neglected, and essential operations such as inventory and management planning, silvicultural operations, afforestation with conifers and research had been abandoned for the war period. All this would affect forest policy in the immediate future and, in view of the likely increases in demand for the various services of the forest in the post-war period, particularly an increase in the demand for wood for home construction, certain things would be necessary; for example, more professional staff, more money for afforestation, silviculture and protection, an increased area of forest reserves, and a rationalisation

of forest industry (which would involve the integration and relocation of some of its elements).[16]

In April 1949 Galbraith was succeeded as Chairman by F. G. Gerraty who had begun his forestry career at Creswick in 1915, had worked in various localities in the state and in various sections of the Department, and had become a Commissioner in 1947. He died in June 1956. During his term of office, A. O. Lawrence and C. M. Ewart were the other Commissioners. It was an appropriate time for Gerraty's interest and skills in harvesting, engineering and utilisation — the post-war demand for housing and general building timbers was heavy and much of the Department's efforts were directed towards tapping new resources. Shortage of labour, rising costs and problems in establishment and development, but severe cuts in loan funds in particular, kept the rate of planting pine below the target level. The threat of *Sirex* in 1951 raised further questions about the advisability of the program. The heavy demand for sawn, round and hewn products was stimulating the Commission to particular concern for the great amount of wood fibre left in the forest in the form of commercially unsuitable trees and operational waste.

A. O. Lawrence, who had been a Commissioner since 1949, became Chairman in December 1956. During the tenure of his chairmanship, there were a number of Commissioners — C. M. Ewart, H. D. Galbraith, A. L. Benallack, F. R. Moulds and C. W. Elsey. One of the first tasks of the new commission was a major reorganisation of the Department whereby the activities of the central administration were regrouped into a number of functional divisions, which, with a territorial arrangement of divisions and districts, forms the basis of its present structure.[17] Lawrence was particularly interested in the proper development and use of natural resources. This was appropriate to a Forests Department going into an era when its conservation role was to be severely challenged by the 'environmental lobby'. The Department had a good record, extending over an active twenty years, of encouraging public recreation in the forest but lacked formal recognition of this role until it was provided by the Forests Act 1958 (which came into operation in March 1959). The Department welcomed this opportunity to expand what it had for a long time regarded as one of its important activities; and it would have welcomed special funds for the purpose with even greater enthusiasm.

Lawrence retired in July 1969, his place as Chairman being taken by F. R. Moulds, who was replaced as a Commissioner by A. J. Threader. By this time, the Victorian service, like its counterpart services elsewhere in Australia, was under fairly heavy fire from conservation pressure groups on a number of counts. The new Commission used its first annual report to return some of the fire, drawing from the 'bible' of forestry (the Manual of Sir William Schlich, written fifty years before) for support for the multiple-use

policy it had been implementing for a considerable time (without much previous interest from the present vociferous quarter). Nevertheless, the implementation of conservation principles and practices, and research to back them, was stepped up further, and the Commission was only too happy to enlist the support, which these pressure groups were now providing through their pressure on the body politic for wider use of the forest, to further the program which it had fostered unaided for so long.

The decade of Moulds' chairmanship saw several broad changes. As the major access systems neared completion, there was less and less emphasis on engineering aspects, which had come to prominence twenty years before, and the plantation extension program, including the purchase of a considerable area of land, continued but at a slower rate. There was, however, considerable expansion in the utilisation of what had by this time become a substantial softwood resource. With the formation of the Land Conservation Council in 1970, the Commission became heavily involved in the primary investigations by the Council and in preparing submissions on forest land use, which not only forced the Commission to clarify its objectives in the new 'environmental era' but reinforced its position as a major and influential user of public land.

On Moulds' retirement in 1978, Threader succeeded him as Chairman, with R. J. Grose and G. Griffin as Commissoners.

The Native Forest

Extent and Structure

In the hundred years in which land has been reserved for forestry purposes in Victoria, there has been ample opportunity for what the Royal Commission at the turn of the century described as an 'exceedingly complex classification and tenure'. At present there is, in simple terms, something in excess of 2 million ha referred to as 'reserved forest' ('timber reserves' and 'permanent forests' being combined in this category in 1962 when these terms were abolished under the Forests (Further Amendment) Act). This area is reserved for forestry purposes and is under the control of the Commission (except for mining). There is a further area of about 4.5 million ha referred to as 'protected forest', mainly unalienated crown land, not reserved for forestry purposes, for which the Minister for Forests is responsible for control of the forest produce (and provision of recreation) but for which in all other respects the Minister for Lands is responsible. These two categories, reserved and protected forest, are combined under the term 'State Forest'. A large proportion of the reserved forest is commercially productive of wood or has the potential for it; only something like a third of the protected forest is productive or potentially so. Something of the order of half of what is

estimated to be about 750,000 ha of privately owned forested land is considered commercially productive. Victoria produces about half the wood it consumes, of which about three-quarters comes from state forests (80 per cent from the native hardwood forests and 20 per cent from the softwood plantations). The other quarter comes from private land. The other half of the wood consumed by the state is imported from interstate and overseas.[18]

There are several prominent kinds of native forest, all dominated by species of *Eucalyptus*. The 'mountain forests' of the cool, high-rainfall areas of the mountain country occupy about 700,000 ha, of which 500,000 ha are state forest and of which about a third is predominantly alpine ash (*E. delegatensis*), mountain ash (*E. regnans*) or shining gum (*E. nitens*) or a mixture of them. This is the major source of high-quality seasoning timber used for furniture, mouldings, flooring, joinery, etc. and of high-quality pulpwood. Something of the order of a half of this area is represented by regrowth, mainly from the 1939 fires. The 'mixed species (stringybark, foothill) forests' of the foothills and plains form the most extensive type, occupying an area of about 4.7 million ha (of which about 4 million ha are state forest). The composition of this forest varies from place to place with pure or mixed stands of various stringybarks, peppermints, gums and silvertop ash. It is a source of sawn timber with a wide variety of uses (mainly light construction) and the major source of pulpwood. The 'box-ironbark' forest occupies about 600,000 ha (of which about 400,000 is state forest). It was in the past the major source of heavy, durable construction timbers for mining, railways, roads, etc. and of fuel, but is to a lesser extent now. The numerous patches of riverain red gum forest cover a total of about 300,000 ha (more than half of which is state forest) and are a source of heavy construction timber, sleepers and the like. There are upwards of 2 million ha of mallee (about three-quarters of which is state forest), and about 300,000 ha of alpine woodland (predominantly state forest). Neither of these is a source of timber.

The Sawmilling Industry

The early settlers in Victoria, as in the other states, looked immediately to wood as a source of shelter and fuel. However, unlike those in some other states, they found it readily available in both quantity and quality. They were more fortunate than their fellows in any other mainland state in having a number of eucalypts which split fairly easily and yet were sufficiently durable for house slabs, palings and shingles, and in also having a number of denser eucalypts from which material for heavier construction purposes could be readily produced by saw and adze. Steam sawmills were also established within the first few years of settlement, and the enormous demand for timber

stimulated by the discovery of gold soon had about seventy sawmills busy. There were double that number by the end of the 1860s.[19]

From then on, for the next fifty years, the story was much the same as elsewhere in Australia — the sawmilling industry gradually came to exercise more 'control' over the forest than the fledgling Forests Department, which struggled to bring some semblance of order and continuity to forest utilisation. For a long time, an 'area' system operated for sawmilling supplies in most forests whereby a miller paid a sum for sole rights to an area and used what he wanted from it. Round timbers and sleepers were cut under a system whereby royalty was paid on the products, a system which also applied to sawmilling in the red gum forests. By the early 1920s, this system was gradually introduced into all the sawmills, royalty being paid on the quantities of timber shown as produced on the sawmiller's books. By that time, too, a little more control was being exerted over sleeper-cutters, whose activities by their nature were not easy to police; indeed, many had been induced to assist in the silvicultural treatment of the forest by favouring hollow trees from which to hew their product. This was not without some protest by sleeper-cutters against the easier life of the sawmill hand, and the Conservator in 1914 was prompted to admonish them publicly in his annual report to Parliament thus:

> A hewer who is steady and industrious, who works six days in the week and is not idle on Saturdays, will, when working in hardwoods of fair quality of the more durable class, get a much higher return for his work than the standard wage alloted to saw-mill employees under Wage Board rates.

The previous Conservator had also been prompted to wonder publicly why the Victorian sawmillers were so disinterested in providing either naturally or artificially seasoned hardwood flooring, weather-boards, lining boards and joinery material in the face of its import from Tasmania. In 1911 the Department decided to instruct by example, and, except for a short-lived transfer of the kiln to the control of the Department of Public Works in 1915, it continued a program of seasoning for many years, providing high quality furniture and joinery material for State Government purposes. It also carried out special jobs such as seasoning (at the Federal Government's request in 1913) the various timbers contributed by the other states for the new offices for the Australian High Commission in London. Despite this example, not only did industry remain disinterested in the matter, but the Department reported considerable difficulty in getting from industry enough sawn material of appropriate quality for seasoning in its kilns. In 1920 it purchased, for this purpose, its own sawmill with rights to a stand of mature mountain ash and messmate.[20] This mill it was to keep going for forty-five years. By the late

1920s, industry began to develop some interest and this received considerable stimulus from the intensive research of the Council for Scientific and Industrial Research (CSIR) in the 1930s, particularly into reconditioning material which had suffered 'collapse' in the seasoning process, a phenomenom to which the ash eucalypts were particularly prone under the seasoning regimes of the time. By the mid-1930s, the department was reporting an increased demand in the state for Victorian hardwoods in preference to imported softwoods as a result of the recent rapid development of kiln seasoning and reconditioning and the improvement in the quality of the product as a result of better grading.

The early mills were steam-powered and mostly located in or close to the forest, the logs being snigged directly to them by horses or bullocks. For a long haulage from forest to mill, tramways were gradually established. These were also used to transport the sawn product to local towns and ports, and to the rapidly developing State railway system for delivery to the capital. The size of the logs, the steepness of the country and the weather conditions combined to limit the use of animals for snigging in many places and steam winches replaced them there. The 1940s brought drastic changes with the development of tractors for snigging and the use of motor vehicles for hauling logs and sawn timber, at the same time necessitating an extensive road-building program. In the post-war years, diesel and electric power replaced steam in the mills, milling equipment became much more sophisticated, and mobile lift-trucks of various kinds replaced man-handling of logs and timber. Output of felling was increased enormously by the substitution of the chain-saw for the axe and crosscut saw.

From the 1940s onwards, the Commission was constantly preoccupied with the structure and location of the hardwood sawmilling industry. The Royal Commission into the 1939 fires had recommended that for safety reasons mills no longer be located in the forest and, in the early post-war years, the Commission was advancing supporting reasons for their relocation. These included the economic, physical and social disadvantages that the timber workers and families suffered by living in mill settlements, and the difficulty of retaining labour, log supplies and transport facilities for a large number of isolated and independent units. The Commission thought that a more economic integration of the industry as a whole was necessary and that this could be brought about through the organisation of re-saw, seasoning and planing plants, and local wood-using industries, in association with large, centralised primary milling units. However, because the resource of the mountain forests within 100–200 km of Melbourne had been so badly affected by the 1939 fires, it was clear that such large conversion centres would have to be located closer to the forests of central and east Gippsland and that an extensive

roading program would be necessary to tap this new resource. However, by the late 1940s, it was clear that not only were the Commission's hopes for a reduction in the number of small sawmills that had sprung up to salvage the burnt mountain forests not going to be realised but that the number was increasing to meet the post-war demand for timber. In the ten years from 1946 to 1956, the number doubled from 300 to 600. The Commission considered legislation should be introduced for regulating the number of sawmills in the state. Whereas it agreed that this matter might seem to be one that was best left to the play of market forces to sort out, most of the raw material was being drawn from the state forests and industry would continue to expect to draw it from the state forests in the future. For this reason, and others arising from it, the Commission thought it should have more than just an influence on the structure, location and composition of the industry — it believed it should have control. It was an argument that appealed to the government of another state — but not to the government of Victoria.

In default of this direct control, the Commission could do no more than continually apprise industry of the likely changes in the supply situation and suggest how industry might respond to them for its own benefit and for the benefit of the wood consumers of the state, to whom the Commission was intrinsically responsible. In a submission to the Industries Assistance Commission inquiry into timber and timber products in 1977, the Forests Commission drew attention to the reasons for its interest in the form and structure of the industry. It pointed out that sawlog harvesting was used as a silvicultural tool for stand regeneration, and that it should therefore be conducted in such a manner as would provide conditions suitable to that end while constrained to meet specifications for environmental protection at a cost which might not be acceptable to inefficient operators. Again, the Commission was concerned to see maximum quantitative and qualitative utilisation of wood fibre, both for intrinsic reasons and to ensure removal of all trees that would otherwise inhibit regeneration. Further, as a State instrumentality, it had a responsible role in helping to maintain a stable rural industry and an economic use of wood in housing and general construction. To this end, it emphasised that, by the end of the next twenty years (i) the amount of mature ash would decrease enormously and the amount of mature mixed species would decrease considerably; (ii) while the amount of mixed species regrowth would stay about the same, the amount of regrowth ash would increase enormously; and (iii) the amount of plantation softwood would increase enormously. The net effect of this would be that the total amount of wood available would increase by about 50 per cent and thus industry would have an assured supply of raw material. However, the replacement of large, old hardwood material by smaller, younger material would involve some locational and

technological changes; the increase in softwood would involve technological change and more integration of the sawmilling industry with the wood-pulp industry; and this relocation and technological development, plus expansion to utilise the increased raw material and to meet expected increases in demand for the processed goods, would necessitate considerable financial investment.[21]

Management

Pushed into the Forests Act of 1907, the government was reluctant to pass over too much control too soon and, though the Department was given control and management of all matters of forest policy, the policy was not defined and the Department was given no authority to manage the forest in the full sense. Thus, for the next decade, most of its 'management' of the native forest took the form of trying to regulate utilisation as best it could, and of carrying out silvicultural improvement such as thinning and slash disposal on the regrowth stands which had followed the early cutting, and making fire lines through them. The 1918 Act was a big step forward because the Department was empowered to frame and enforce management planning, and it set about compiling classical working plans to try to bring some order into what had been relatively uncontrolled utilisation. The first Commission saw two major silvicultural problems. One was the presence of large areas of mature and over-mature forest which needed to be logged and replaced by young healthy stands as soon as possible. The other was the lack of regeneration in the drier districts on the poorer soils, particularly in the box-ironbark forests, owing to the prevalence of rabbits.

Until 1925, the improvement work was concentrated on the forests of the more durable species — the box-ironbark and red gum forests. These had suffered so heavily from mining and other development that, with a shortage of funds, their replacement took priority. In that year, Parliament voted the first loan moneys (£500,000) and immediately it became possible to consider improving the mountain forests, which had now become the main centre of milling operations. One problem was the lack of definition between the reserved forest and unoccupied crown land — a boundary which the grazier's match did not recognise. The Department needed more control of this forested area or improvement work might be to no avail. It also wanted more of the mountain forest in order to reach the target of 2,250,000 ha which the Premiers' Conference in Hobart in 1920 had agreed was necessary to meet Victoria's needs. All it could see at the moment was a continuous whittling away of this forest and assignment of portions of it to 'bodies whose policy it is to definitely lock them up and prevent the utilisation of timber in any way', a practice which was roundly opposed by the Imperial Forestry Conference in Australia in 1928. Meanwhile, mapping and inventory of the state forests continued and,

in the first decade of the Commission, working-plan control had been established over an area of 100,000 ha.

In its 1938 annual report, the Commission went to some length to outline its views on the 'rational utilisation' of the native resource. It was not to know that, by the time of its next annual report, the conflagration of 1939 would not only completely upset all its plans for rational utilisation but would set problems in rational utilisation for future Commissions for as far ahead as could be seen, particularly with the ash resource. Since the wood of killed ash-type eucalypts deteriorates fairly rapidly, standing or felled, utilisation organisation and operations for the next few years were dominated by the need to salvage as much as possible of what had represented, in the now burnt forest in the mountainous east-central part of the state, the most important current and future source of high-quality sawn timber.

Immediately after the fires, it was thought that something like half of the estimated six million cubic metres of killed wood might be recoverable given Treasury assistance and the cooperation of industry. A Committee of Commision officers, sawmillers, merchants, CSIRO scientists and timber workers set about the formidable task of recovering it. Despite early problems of unfavourable weather, a shortage of experienced labour, a serious industrial dispute, and later problems of shortages of labour, equipment and transport resulting from the war, the salvaging and marketing of this great amount of timber, which would otherwise have been lost, was effected on schedule. Indeed, the salvage program was to continue longer than anticipated and half as much again was recovered as had originally been thought possible, partly due to the urgent war-time demands for sawn timber and the equally demanding early post-war period, and partly due to accumulating experience of the most effective ways of preventing wood deterioration. Although later and better estimates suggested a far greater amount had been killed than was thought at the time, the salvage effort was an enormous one and must rank high in the success list of this kind of operation anywhere in the world.

Of the several influences on the future of the wood products industry to which the Commission drew attention in 1977, the regrowth ash was the most spectacular, with a major surge of production beginning towards the end of the 1980s. The important role it would play in future supply had been prominent in the Commission's thinking even before the 1939 fires were out, and the organisation of this resource in recent years, as the state's major source of supply of high-quality sawlogs and pulpwood, has been one of the most outstanding examples of forest management planning in Australia. Thirty years after the fires, the picture of the ash resource looked, in very broad terms, like this. The total resource was of the order of 250,000 ha: about 10 per cent of it was unlogged mature to over-mature forest; about 25 per cent had been logged since 1939,

with about one-third of this unsatisfactorily regenerated, and the other two-thirds poorly regenerated; about 20 per cent of the area had been burnt in fires previous to 1939 or had been taken over by or returned to the Commission after other land use, with about one-third of this now having advanced regrowth on it and with the remainder denuded of ash; just under half (about 45 per cent) was regrowth from the 1939 fires. Between a half and two-thirds of the total resource was within 200 km to the north-east and east of Melbourne, including about 80 per cent of the 1939 regrowth.

Within that thirty years, there had been no lack of problems. It soon became clear after the fires that most of the burnt area was regenerating satisfactorily. The main problem was protecting it from future fire because, if the regrowth were killed before it had developed sufficiently to carry fertile seed in quantity, the area was likely to revert to bracken, wattle or 'scrub', as had happened to many areas of regrowth from fires prior to 1939. For many years it was in a hazardous condition, with vast numbers of large fire-killed trees still standing, a mass of partly-burnt debris on the forest floor and rapidly accumulating litter from the regrowth. It says much for the greatly enhanced protection organisation that followed the fires that further fires in the regrowth were confined to a very small area. But regenerating the virgin forest as it was logged did have its problems and, in the mid-1950s, research was begun on the germination characteristics of the ash-type eucalypts which led to an improved understanding of the field conditions most appropriate to germination. This was followed by a considerable amount of field research into how these conditions might most readily and economically be established in association with harvesting operations, and into how, once those conditions were established, an area might be most economically and successfully seeded. Aerial seeding became largely the answer to this problem. Regenerating the denuded areas was in some ways even more a problem until research proved that the aerial spraying of herbicides was effective in killing the wattle and scrub for clearing, burning and aerial seeding to follow. Another major problem was to determine whether the regrowth should or could be thinned, and if so, when and how. Although the species are fast growing and tend to thin themselves fairly effectively, it was thought that artificial thinning might well prove economical if, as a result of it, growth were directed onto the best stems and if wood were salvaged that would otherwise be lost in suppression. Research initiated in the early 1960s led to silviculturally suitable regimes but also showed thinning to be difficult and costly, with problems from epicormic growth if the stand were opened up too heavily and from fungal attack on wounds caused in harvesting.

The most challenging problems, however, lay in organising the harvesting. There was a heavily unbalanced distribution of stand age

classes (and thus tree size, tree quality and wood product classes) with nearly half the resource approximately the same age. The geographical distribution of these stands was also heavily unbalanced. However, each stand would have to be cut as closely as possible to its age of maximum production, annual production would have to be increased in such a way that it neither embarrassed the capacity of the industry to convert it or the capacity of the market to absorb it, and the pattern of harvesting would need to establish a better stand age-class distribution for the future than the present one. The organisation of the harvesting would have to meet these many requirements while having regard for numerous stringent environmental considerations. Inventory of the resource in the early 1960s was followed by the development in the mid–1960s of mathematical functions for the estimation of tree and stand volume. This was followed in turn by several years' work on the development of mathematical models for estimating the growth and yield of the ash stands under a wide range of natural and artificial conditions and on the development of systems for optimising the scheduling of wood production to meet the requirements referred to above. The results of the work proved an outstanding application of the concepts and tools of modern biometrics and operations research to complex forestry problems, much of it pioneered in Australia by members of the Victorian Department and associated workers.

Pulpwood

From its earliest days, the Department had looked forward to the eventual development of socio-economic conditions that would promote the interest of industry in using forest and sawmill waste for the production of wood pulp. Industry began to show this interest in the 1930s and in 1936 the government, the Commission and Australian Paper Manufacturers Ltd (APM) reached an agreement whereby, with the passing of a Wood Pulp Agreement Act, certain pulpwood rights were secured to the company for fifty years over an area of about 200,000 ha of reserved forest and vacant crown land. The Commission was to retain full control over the pulpwood cutting operations and was to ensure that pulpwood extraction be secondary to the utilisation of the more valuable types of produce such as logs for sawn timber, poles and piles, the main material being of the ash eucalypts from both mature trees and thinnings.[22] The company proceeded to establish a plant at Maryvale, Gippsland, for the manufacture of kraft papers. It came into production in October 1939 and for some years much of its wood supply came from the fire-killed ash forest.

This was but the first step in the realisation of the Department's ambitions for much closer utilisation and, in the early 1950s, it was actively looking to the establishment of other industries to help

absorb the vast amount of material in the state forests that was unsuitable for sawmilling or round produce and the unused parts of trees felled in sawlog harvesting, as well as the considerable amount of sawmill waste. As a result, a Forests (Masonite Agreement) Act was passed in 1956 whereby the government committed the Commission to supply appropriate material to a factory to be established at Eildon by Masonite Corporation (Aust.) Pty Ltd for the manufacture of hardboard products. (At about the same time, the establishment of two private plants for the impregnation of poles of otherwise non-durable species provided the Department with a further opportunity for wider utilisation combined with beneficial treatment of the forest.)

Anticipating a review in 1960 of its commitments to APM in accordance with the 1936 Act, the Commission began a pulpwood resources survey in 1958 of the areas defined in the agreement and also in other forests in the south-east. A similar survey was undertaken in the Ballarat area in the light of a proposal by Colonial Sugar Refining Company Ltd to establish a hardboard plant in that area.[23] In the following year, the Forests (Pulpwood Agreement) Act 1959 ratified the supply of pulp by the Commission to a plant the company was constructing at Bacchus Marsh.[24] With the Forests (Wood Pulp) Agreement Act 1961, the original provisions governing APM's operations until 1987 were amended by way of a revision of the forest area available for pulpwood, an increase in supply commensurate with development of the industry, and increased and differential royalties. Further amendments to the agreement were made in 1966, and these amendments, as they related to pulpwood from hardwood forests, were amended further by the Forests (Wood Pulp Agreements) Act of 1974.

The interest of Japanese buyers in woodchips from Australia in 1967–68 included Victoria, and the Department carried out pulpwood resource inventories in the areas within economic range of Eden (in New South Wales) and Portland for this purpose. Applications were invited for the resource in the eastern part of the state but did not attract any proposals sound enough to accept. Nor did the proposal attract any comment or adverse reaction on environmental grounds. During 1972, a group of sawmillers formed a company to chip sawmill residues in East Gippsland for supply to the Harris–Daishowa plant at Eden and commenced deliveries in December of that year.[25] Towards the end of the 1970s, the Commission raised the question of extensive integrated sawlog and pulpwood logging of the East Gippsland forests. In accordance with the State Government's environmental legislation, which had been enacted since its invitation for proposals for pulpwood utilisation from the area in 1968, the Commission was instructed by the government to prepare a statement on the likely

environmental effects of its scheme. On this occasion there was a considerable amount of opposition to the project from various groups.

Royalties

In the late 1930s, the Department was able to extend the method of assessing royalty on the basis of log measurement. Although this had been the practice for some years in areas where close supervision was possible, millers in the mountainous areas continued to pay royalty on the basis of production. They had always fought strenuously to retain this practice whenever there were moves to change it, and the Department had accepted it as an expedient because at the time nearly all the sawn product was transported by rail and checking was reasonably practicable. Now, with road transport, this was no longer so, and the wider move to seasoning and dressing had introduced problems in assessing just what was 'sawn production'. The shift of operations from the mountain forests within 100 km or so of Melbourne to the further ones of Central and East Gippsland in the 1940s also necessitated a further review of royalties to bring supply into economic range of the Melbourne market. The Department and industry therefore combined to devise a system that would allow sawmillers operating in remote areas to compete equally on the Melbourne market with those located nearer to it. The system was to be both 'simple and equitable', a tall order considering the complexities. However, what was described as a Royalty Equation System was introduced in January 1950 and, with various modifications, it is still operating.

Firewood

One of the pressing requirements of the Commission during the war was to organise emergency supplies of firewood for a range of uses — military and civilian heating and cooking, and as a substitute for coal for locomotives. At one stage, annual production was upward of half a million tonnes. Much of it came from salvage operations in the various forests, including the red gum of the Murray (which involved a long haul to Melbourne), and much of it was produced by internee and prisoner-of-war labour. Although the Commission was expressing rather strong hopes in 1947 that it might relinquish the field entirely to private enterprise, as in pre-war times, it was 1952 before it was able to do so, the main labour force at this time being assisted migrants from Europe. Ironically, by the late 1950s, the Commission was deploring the marked reduction in interest in industrial firewood, a result of an increasing trend to oil and electricity, in a number of country areas where it had depended on fuelwood operations for silvicultural treatment.

Plantations

Despite the fact that the native forest remaining today covers something like a third of the state and includes some of the tallest trees in the world, Victorians were recommending the establishment of plantations more than a hundred years ago, for two reasons. One was the large-scale and mostly destructive cutting associated with the discovery of gold in the early 1850s, and the expansion of mining activity and the rapid increase in population which followed that first discovery. The other reason was the lack of coniferous-type wood in the native forest. The official reports on the situation at this time all stressed to the government the need for plantations of broadleaved and coniferous species, both indigenous and exotic, and in 1872 a nursery was established at Mount Macedon (about 70 km north-west of Melbourne) to provide stock for these plantations, for other interested government institutions (such as the Railways Department and the Education Department) and for the public. One of the species was radiata pine. Probably first introduced from western USA to Australia in 1857 in the form of a few plants for the Sydney and Melbourne Botanical Gardens, Ferdinand von Mueller (then Director of the Melbourne Gardens) encouraged its distribution throughout Victoria (and elsewhere in Australia) for shelterbelt and ornamental purposes from about 1859[26] and its performance in the Macedon area was sufficiently promising for commercial planting of it to be undertaken there in 1880.

The main emphasis at first was on broadleaved species such as eucalypts for mining timbers and wattles for tanbark. On top of the official planting program, outside interests were so enthusiastic that the Macedon nursery could not keep pace with the demand and four more nurseries were established during 1888–90, at Creswick (near Ballarat), at Havelock (near Maryborough), on Gunbower Island (in the Murray River) and in the You Yangs.[27] Twenty years later there were 1000 ha of plantations, mainly hardwood, in the vicinity of these nurseries. However, the need for softwood was equally pressing and the success of radiata pine relative to the many other conifers which had been tried, on sites which did favour it such as the Creswick area, led to a fairly vigorous program of establishing it there about 1906, by which time the early plantings around Macedon were being cut for fruit cases.[28]

By 1915 there were about 1600 ha of hardwoods (mainly eucalypts), 1200 ha of wattles and 2400 ha of pines and fir.[29] The Conservator, Mackay, thought it highly desirable that the annual planting rate should be greatly increased, particularly for conifers. The problem was to find sufficiently extensive an area suitable to them. Since useful hardwood should not be displaced for this purpose, the Department was restricted to the waste crown lands of the southern coast, at that time 'dreary wastes of the poorest type'; but he saw the great

pinaster (maritime) pine plantations of the Landes in south-west France as an example of what could be done with a vigorous policy. In view of the emphasis on planting radiata pine, the Conservator took the opportunity to refute recent criticism in a Melbourne journal that its timber was worthless — a view also posed by Ribbentrop in his report to the government twenty years earlier. Unfortunately, mainly because of drainage problems, the plantings on the coastal sands were so unsuccessful that very little of the 10,000 ha planted up to 1935 remains as productive plantation today. Fortunately, radiata pine did prove successful on the stringybark sites of the foothill forests and on the mountain ash sites of the mountain forests, with an annual rainfall of at least 750 mm. Planting went ahead on such sites, some on old farmland bought by the Commission for the purpose, until 1939, partly stimulated by unemployment relief grants during the economic depression of that period and partly depressed by a loss of 4000 ha in the 1939 fires.

For the next twenty years, except for minor increases in 1946–50, planting was at a low level: in the early 1940s because of the war, and during the 1950s because of shortage of labour, shortage of funds, rapidly rising costs and problems in plantation establishment. But a start was made to planting what was to become a large purchase by the Commission of failed farmland in the Strzelecki Ranges in South Gippsland which had previously carried fine eucalypt forest.[30]

In early 1951, the whole conifer program came under threat when timber cargoes from the northern hemisphere (mainly spruce and fir) containing live *Sirex* wasps in all stages of development were unloaded in several Australian ports including Melbourne.[31] Immediate quarantine measures were taken and the various State and Commonwealth authorities were alerted to the danger. The Quarantine Service continued to intercept more infested cargoes in the following two years. Though every effort was made by the various authorities to prevent the wasp being released into Victoria, monitoring of radiata pine was begun immediately for any sign of the insect or the effects of its attack, and the lack of any sign of either for the next few years raised hopes that the strenuous efforts to quarantine the insect had been successful.

In 1961, the Commission embarked on an expanded plantation program of 2000 ha per year, aiming at an additional 80,000 ha during the next 40 years, mainly of radiata pine, for an estimated population of seven million by the turn of the century. The government's agreement to this had been promoted, according to the Commission's 1960–61 report to Parliament, by the Chairman's report arising out of his attendance at the World Forestry Congress in the USA in 1960. During the next four years, this new schedule was maintained; but it received something of a setback right at the beginning from reports of infestation by *Sirex* in scattered trees and shelterbelts on private

property within a large area to the north and east of Melbourne and a smaller area in the Latrobe Valley.[32] This threat to the extensive plantation area in the state was sufficient for the Commonwealth and State Governments to establish a National Sirex Fund with an immediate grant of £200,000 to finance a research and eradication program, further amounts being contributed by commercial plantation owners. As part of the eradication program, the cooperation of landowners (including both physical and financial help) was sought in the felling and burning of infested trees. During the following year, nearly 10,000 trees were felled and destroyed on more than 500 properties. The 'search and destroy' campaign was unhappily confused by fires near Melbourne in January 1962 which killed a lot of trees; these also had to be felled because of the particular susceptibility of sick and dead trees to infestation. The cost of the program was also fairly heavy; within five years nearly £500,000 had been spent on survey, eradication and mill inspection.[33] But, by this time, the magnitude of the threat had been enlarged by the discovery of infested trees in a state plantation near Macedon.[34] From that time onwards the boundary of the infestation was reported every few years as extending further and further from Melbourne, the original focal point, until by 1980 the wasp had been found in all the major pine-growing areas of the state except in the far west (though it had been reported not far away in South Australia).[35] The program of eradication by destruction had been replaced in 1972 by methods of biological control.[36]

With the Softwood Forestry Agreements Act of 1967, Victoria set itself an annual program of 2800 ha in 1967, rising to 4800 ha in 1971. At the end of this first period of the agreement, it had successfully established its target of 20,000 ha in the eight zones, over a wide area of the state, which had been especially selected as productive bases for industries in the future. The 26,000 ha planted during the next agreement period 1971–77 was very close to the schedule. Planting continued in the next two years at a rate of about 3500 ha. By that time, the total area of State conifer plantations was of the order of 83,000 ha, of which 95 per cent was radiata pine. Something like a quarter of the planting of the expanded program from 1962 to 1976 was done on former farmland purchased for the purpose. There was an area of 77,000 ha under private ownership, practically all radiata. To enhance the interest of small landholders in an afforestation program to improve farm income as well as contribute towards meeting the state's needs for wood, legislation had been enacted in late 1964 to provide financial assistance for the establishment of woodlots for commercial purposes by way of loans of up to $125 per hectare (with a maximum of $5,000) free of interest for twelve years. By 1980, 300 agreements were current with advances exceeding a million dollars and 6000 ha of woodlots had been established.

The expansion by APM of its activities prompted a revision during the late 1950s of the area of crown forest available to it for pulpwood supplies which had been set in the agreement in 1936. The resulting Forests (Wood Pulp Agreement) Act 1961 ratified changes in the supply area and incorporated a schedule granting the company a lease of some of the failed farmland in the Strzeleckis, which had been purchased by or had reverted to the Crown and was being reforested as part of the Commission's program, conditional on the company reforesting the area with broadleaved or coniferous species suitable for the manufacture of paper pulp. The agreement was further extended by legislation in 1966, and the company increased its leasehold for the establishment of plantations to about 8000 ha. APM also obtained two areas under the Land (Plantations Areas) Act 1959, by which crown land could be made available to companies for pine planting.

In 1969–70, the Commission announced the availability of a large amount of coniferous pulpwood in north-eastern Victoria and invited proposals for its utilisation. The Commission's agreement for a supply of pine pulpwood for groundwood pulp manufacture was ratified in 1972 with the Forests (Bowater-Scott Agreement) Act, the company concerned having proposed the eventual establishment of an integrated pulping, sawmilling, veneer manufacture and timber preservation complex.[37] The establishment of a large industrial plant at Albury by Australian Newsprint Mills for the production of pulp and paper provided the Commission with the opportunity to utilise fully the large coniferous pulpwood resource in the north-east, the agreement being ratified in January 1981 by the Forests (Australian Newsprint Mills Ltd) Act 1980.[38]

Fire

As its first annual report in 1920 made clear, the Commission had no illusions about the enormous job in front of it of reducing the risk and hazard of forest wildfire to manageable proportions. However, given the great distance it had travelled in that direction in less than twenty years, its comments on the 1937–38 fire season in its annual report for that year were understandably confident:

> Despite hazardous conditions which prevailed over a long period, damage to forest reserves by fire was confined to a relatively small area. This is particularly gratifying and is an indication that the intensive fire protection organisation now in operation is proving effective.

In the light of events less than a year later, this assessment was to seem grimly ironic for 'Never before in the history of Australia have such disastrous conflagrations been experienced nor the resultant

damage and destruction been so enormous'.[39] The stage for this 'momentous event' was set by a previous dry summer and below-average rainfall throughout the winter. Serious forest fires developed unusually early in August and from then on fires began in many parts of the state. Mr Justice Stretton described these in his report of the subsequent Royal Commission of Inquiry[40] as joining 'forces in a devastating confluence of flame' on Friday 13 January, a 'Black Friday' with a maximum temperature of 46°C, a relative humidity of 8 per cent and winds of between 30 and 60 km/h. 'On that day it appeared the whole State was alight. Seventy one lives were lost. Sixty nine mills were burned. Millions of acres of fine forest . . . were destroyed or badly damaged . . . Townships were obliterated . . .'. It was a period of horror which has been described in numerous formal and informal reports. The Royal Commissioner investigated the causes and origins of the fires — as he said, 'lit by the hand of man' — the measures taken to prevent the outbreak and spread of the fires and measures taken to protect life and private and public property, and made extensive recommendations regarding the prevention of the outbreak and spreading of such fires in the future. Amongst his other findings, he found the capacity of the Forests Commission to do what it should do, and knew it should do, had in the past been jeopardised by inadequate funding for it and a lack of independent control over its finances.

It was obvious, of course, that no fire-protection organisation could possibly have proved 'effective' in the combined circumstances of the 1939 fires. However many things could be done to reduce the likelihood of such a combination again and, in its submission to the Royal Commission, the Forests Commission discussed a number of them. One of the major problems, according to the Commission, was that, though it was responsible for the fire protection of the 'protected forest' (i.e. certain unoccupied crown lands), it had no control over the uses of it and grazing interests were responsible each year for a relatively high percentage of fires on those lands. With limited staff and funds for protection, the Commission had naturally given priority to those areas of the reserved forest which carried the most valuable timber and were the most hazardous. There were insufficient staff and funds to protect the 'protected' forest and this was a major source of fires. In addition, most of the fires on the reserved forests originated in adjoining settled areas. The Commission needed a greater role in control of the protected forest, and it needed authority to control fires on properties adjoining the reserved forest. Furthermore, apart from the Bush Fire Brigades movement, whose activities were restricted to suppression, the Commission was the only institution with the organisation, expertise and experience to handle rural fires and, in conditions like those of 1939, it had come, by default, to be regarded as rural fire warden for the whole state. But it had neither

authority, staff nor funds to undertake such an enormous task. It was to get strong support for these and other views from the Royal Commissioner, from the interstate bushfire conference of State and Commonwealth forestry authorities organised by the Premier for August 1939, and from a subsequent Royal Commission on grazing in 1945–46.

By legislation brought down in late 1939, the Commission's responsibility for fire protection was extended to all unoccupied crown lands (though without including control of grazing) and to national parks. In line with these new responsibilities, the Commission outlined a new policy in its 1940–41 annual report to Parliament: (i) control of fires in private foothill country to which the mountain forests were particularly vulnerable; (ii) control of outbreaks in areas of concentrated forest industry operations; and (iii) maintaining secondary lines of defence in the forests themselves. Unfortunately, Australia was by this time on a war footing and the opportunities for the practical implementation of the several elements of the new policy were rather limited though the Commission struggled, in the face of the other great demands placed on it in this time of national emergency, to get together more and better equipment for fire suppression and for communication, and to increase and improve access to and within the forest. One bonus of the times was the cooperation of the Royal Australian Air Force in fire-spotting during the summer and the development of means of direct communication between air-crew and Commission ground staff. The Country Fire Authority Act of 1944 placed the responsibility for country fire protection more firmly into the hands of two authorities, the Forests Commission, with responsibility for most public lands, and the Country Fire Authority, with responsibility for most other rural land. The CFA consisted of a permanent chairman and ten other members representing local government authorities, insurance underwriters, the Minister of Forests and about 1300 rural and urban fire brigades composed of 170,000 members.[41]

From the end of World War II, the Commission was in a much better position to extend and improve the quantity and quality of its fire protection, and it took advantage of every opportunity to do so. Although it took a direct interest in the rain-making experiments of the time (which unfortunately did not realise their early promise), it could still do little to affect the large-scale vagaries of the weather, which are the most important influence on fire in the state. The 1955–56 annual report, for example, recorded that the 'summer was unique in being the mildest and wettest on record and on only one day 22 November was there any serious degree of fire danger'. Just ten years later, the picture was a grim one, with 300,000 ha of forest burnt at a suppression cost in the vicinity of £200,000. But the Commission did make a very determined effort to do everything else within its

capacity, such as improving its understanding and forecasting of the weather and hazard-related conditions, increasing its expertise in fire prevention, detection and suppression, developing an effective communication system, and raising the protection-consciousness of the public. Foremost in its efforts to reduce the fire hazard was the adoption of a program of fuel reduction burning. Although the weather conditions of 1939 might well be experienced again, or worse conditions arise, the Commission felt, forty years later, better placed to meet them.

Water

The control and use of water in streams in Victoria is vested in the State water authority and various water trusts. Those catchments which are forested are, in the case of most of the water trusts, also used for wood production, with those on public lands usually being managed for this multiple use by the Forests Commission. Towards the end of the 1950s, the Commission set out to formalise its relations with the various water trusts by promulgating instructions to its field staff embracing the major principles to be observed in wood utilisation on water catchments and by issuing detailed operational prescriptions, prepared in cooperation with the responsible water trust, for each individual catchment. Within a few years, this had been done for some sixty catchments. The major exception to this multiple-use management of forested catchments by the Forests Commission is the Melbourne and Metropolitan Board of Works' responsibility for water supply to Melbourne, which has more than half the population of the state. The Board controls some 120,000 ha of catchments, mostly in the Central Highlands to the north and east and within a radius of about 100 km of the city. Most of the area is forested, about half of it carrying highly-productive forest, which yields about three-quarters of the water supply. Since the Board was formed in 1890 to take over the operation of Melbourne's water supply system from the government, it has maintained the 'closed catchment' policy which it inherited.

From its early beginnings, the forest service has held the view, as firmly expressed in its annual report to Parliament in 1938–39, 'that utilisation of timber growing on catchment areas under adequate regulations and supervision in no wise impairs the efficiency of the watersheds for conservation of water nor does it prejudice the purity of the water supplies obtained therefrom'. It has therefore continuously opposed the Board's closed catchment policy on principle. Understandably, the timber industry has also continuously pressed the Board to allow harvesting of the catchments. The combination of the devastation wrought by the 1939 fires, the increased drain on the forest to meet war-time requirements, and the heavy demand for timber in the post-war building boom, served to increase the claims of

the Commission and industry for access to the large quantities of timber of high commercial value on the Board's catchments, and in 1958 the government referred the whole matter of timber utilisation on catchments to the Parliamentary State Development Committee. The Commission's interpretation of the committee's report was that it substantially endorsed Commission policy. It recommended, for example 'that controlled logging based on the established silvicultural and regeneration management practices of the Forests Commission be permitted under strict supervision in all catchment areas'.[42] Nevertheless the Board's policy was not changed.

The Melbourne and Metropolitan Board of Works had begun research into the effects of the forest cover on the quantity and quality of water in its catchments as early as 1948, and, in the early 1960s, had become involved in joint catchment research with other government organisations including the Forests Commission. In 1965, the Parliamentary Public Works Committee began an inquiry into future water supplies for Melbourne. The Commission submitted its long-standing views on multiple-use management of catchments and evidence of what it felt it could claim as successful implementation of that management. The Commission therefore felt it should express concern in its 1966–67 annual report to Parliament that, as a result of the Public Works Committee's recommendations that Melbourne's water resource be expanded by inclusion of the catchments of several tributaries of the Yarra River, an area of about 16,000 ha of timber-productive reserved forest was to be withdrawn from the Commission's control and thus from timber harvesting. As part of the negotiations, the Board undertook to proceed with research in catchment management aimed at resolving some of the issues which had been raised in the various submissions to the Public Works Committee opposing the closed catchment policy. In June 1967, the government set the overall objective of this research as 'to determine whether, or under what conditions, controlled logging in the water catchments may be practicable without detriment to the quality or quantity of the water supply', and indicated that the matter of control and management of the Board's catchments was to be reviewed after ten years of research. The Board accordingly expanded its research in line with this objective and, in response to the government's directive that the results should be made available as the research progressed, it began publishing progress reports in 1971. In 1980, in keeping with the requirement of the 'ten year review', the Board published 'technical conclusions' that could be drawn at that time in relation to the objective. There were two main conclusions. One was that limited harvesting operations could be carried out in certain areas without detriment to water quality given good planning and rigorous implementation of protection prescriptions; otherwise, such operations were likely to have a deleterious effect on water quality. The other

was that the age and density of the forest cover, and so natural events such as bushfires or artificial manipulation of the cover, had a major impact on water quantity.[43]

Land Use

In 1968, proposals were made, with strong political support, for the alienation of a substantial area of semi-arid public land of the Little Desert region (in the central-west of the state, adjoining South Australia) for settlement. These proposals were based on the very limited success of agriculture and grazing in somewhat similar land to the south. By this time, the use of public land had become in Victoria, as in most of the other states, a matter of considerable public interest and these proposals for the settlement of the Little Desert joined a fairly long list of sensitive issues. Economics-minded members of the public protested at the marginal nature of the agriculture; conservation-minded members of the public protested at the likely destruction of a unique flora and pressed for its preservation. There was also a fairly strong political content in the issue. The reactions were in total sufficiently adverse as to threaten the government's standing and were to a large extent responsible for the enactment in November 1970 of land-use legislation in the form of a Land Conservation Act.

The thrust of the Act was that there should be a Land Conservation Council composed of the heads (or their nominees) of the main government departments involved in control or management of public lands (such as the Forests Commission) along with several other persons from outside the bureaucracy concerned about or involved with the conservation of natural resources. The main function of this Council was to 'carry out investigations and make recommendations to the Minister with respect to the use of the public land in order to provide for the balanced use of land in Victoria', 'public land' being in the main the unalienated land outside the boundaries of any city, town or borough, representing between a quarter and a third of the state, most of it forested and including state forest (i.e. reserved and protected). The Council was directed, in carrying out such investigations and making its recommendations, to consider ecological, landscape, historical, recreation, preservation and conservation aspects of land use in regard to the present and future needs of the people of Victoria, and to provide opportunities for submission by the public in respect of the initial investigation, the report of the investigation and the recommendations arising out of it. The Council began its duties in 1971, dividing the state into seventeen study areas for the purpose and drawing up an extensive classification of land uses as a frame for recommending the use or uses of appropriate subdivisions of each study area.

As in the other states, land-use planning and the control and the management of land have a long history in Victoria, and the creation of the Land Conservation Council was but one in a continuous series of mechanisms created to meet the exigencies of a particular time. As it is responsible only for providing advice to the government, and then only in respect of unalienated rural public land, its role in the total planning of land use in the state is obviously limited. Also the effectiveness of its role is largely dependent on the effectiveness of the overall coordination of planning provided by the State Coordination Council, which was set up as a supra-body in 1976 to coordinate the functions of the Land Conservation Council, along with those of the many planning agencies operating under the Town and Country Planning Act. Nevertheless, despite the qualitative nature of its investigations and the lack of economic evaluations which has been the basis of some criticism of its approach,[44] in basing its recommendations on fairly thorough investigation of the resource and in the avenues it provides for public influence on its recommendations, the Council has appeared to be a considerable improvement on its predecessors and has so far had a high success rate in its recommendations to the government.

From the inception of the Council, the role of the Forests Commission in determining the use of reserved forest, and its influence on the use of the protected forest, has necessarily had to change. As a member of the Council, the Commission has had to provide appropriate data for the Council's investigations, define its own views on the use of land in which it has an interest and then attempt to reach a consensus with other members of the Council in drawing up recommendations which are likely to appeal to the government. It may then have to implement recommendations to which it may not have been able to offer whole-hearted support. The impact of the Council on the Commission with regard to land tenure, land use and management practices (to 1977) has been discussed in some detail by P. G. Sheehan.[45]

Conservation and Recreation

For various reasons, including the proximity of forests of great natural beauty to Melbourne and other major population centres, and the ready access both to and within these forests (to a large extent provided by the Commission), Victorians have for a long time regarded the forest estate as an obvious centre for many recreational pursuits. From its beginnings, the Commission has been happy to foster this in line with its general policy of multiple use, at the same time being bound by the practical constraints of government funding. It was recognised even in the early legislation that the provision of some 'recreational and aesthetic aspects of forest management' might best be assured by zoning areas for special management, and an area

of reserved forest was set aside as early as 1912 for the preservation of flora and scenery.[46] The obvious popularity of the forest, and the Commission's hopes of developing a public 'forest conscience' to support its programs in general, prompted it to express a firm view to Parliament in the mid-1930s 'That wherever possible [the] rapidly growing recreation area of the forest domain should be catered for and encouraged'. But, between the aftermath of the economic depression, the 1939 fires, World War II, the post-war demands for wood, and the continual shortage of funds for development purposes, it was not until the 1950s that the Commission was able to think seriously of an organised, extensive conservation and recreation program. In 1957, such a program was initiated with the reservation of an 800 ha forest park in the Dandenongs and four scenic reserves, and committees of management and advisory committees composed of people outside the Public Service were appointed. Within the next twenty years, the total area of forest parks and various kinds of reserves had grown to more than 50,000 ha.

The continuing increase in public demand for recreation in the forest during the 1960s prompted the Commission to establish a Recreational Forestry Branch in the early 1970s (subsequently the Forestry Environment and Recreation Branch of the Division of Forest Management) charged with researching present and likely future visitor use in the most popular multiple-use areas and in the special reserves as a basis for more effective planning. By this time, like the forest services in the other states, the Commission was coming under increasing criticism from the 'environmental movement' and, in its annual report to Parliament for 1970, it took the opportunity to point out that, apart from the special reserves, where priority was given to conservation and recreation, these aspects were being given some attention in all the reserved forest, which in fact occupied something like 10 per cent of the total area of the state. It obviously felt no apology was necessary for the fact that, as forest uses, conservation and recreation were secondary to the main one of wood production in this reserved forest — that was the term of its political charter. However, it could also claim a long-established interest in, and sense of responsibility for, various matters of the environment that preceded much of the public expression of concern for them. For example, studies had begun in the early 1960s on the effects of forestry operations on the native fauna with a view to developing procedures which would provide an appropriate range of animal habitats. An intensive ecological study was commenced in the early 1970s in a Gippsland forest of about 16,000 ha, on which harvesting had been carried out for nearly thirty years, on the effects of various forest operations on a great range of related aspects. Furthermore, the Victorian forest service had been pre-eminent in Australia in investigations into planning the harvesting of wood from

forests of high landscape values so as to reduce adverse effects on the landscape to a minimum (and it continues to lead the field in this work).

With the establishment of the Land Conservation Council in 1970, the scope for the reservation of forest land for purposes of conservation and preservation increased enormously and the Commission's role increased commensurately. There are upwards of a dozen categories of reserves used by the Council which may be regarded as having conservation as their major purpose. The Commission has management responsibility for many of them and fire protection responsibility for all of them. Many of them, by their special nature, make demands on protection skills well above the routine.

Forestry Education

The supply of professional staff was of paramount concern to the early Conservators. Perrin gave it prominence in his first annual report to Parliament in 1890. 'Where,' he asked, 'were trained men to come from?' And he answered, 'From our own colony.' In his view, men from Victoria trained in the state were the most appropriate for Victorian forest conditions. He recommended a two-year joint agriculture–forestry course at either Longerenong or Dookie Agriculture College, followed by practical work in the nurseries and forests. He saw a forestry school gradually developing out of this and graduation from it as mandatory for admission to the Department.[47] Vincent had made somewhat similar suggestions in his report a few years earlier,[48] but the government, being at the time more interested in calling for reports than in implementing their recommendations, had done nothing.

The recommendations of the Royal Commission of 1897 may have been more influential, though it took a further decade of pressure, from both within and from outside Parliament, before the government set up the Forests Department and accepted its recommendation for the establishment of a school to train field officers.[49] Within a year, the Department was happy to report that 'a first class building with adequate grounds has been secured at Creswick, in the near vicinity of the State Forest, State Plantation and Nursery', that the work of renovating and fitting up the buildings was approaching completion, and, though class teaching would be given its due place, practical work would be kept in the foreground.[50]

The school began operating in October 1910 though it was not formally opened until May 1913.[51] The initial class of six students was composed both of men who were already in training as foresters under the Department's system of supervised practical work, and men appointed directly from work crews.[52] Lectures in basic science subjects and surveying were given by instructors from the Ballarat School of Mines 'owing to the difficulty of getting teachers and the

necessity of keeping down expenses'.[53] To provide dormitory accommodation, the government transferred to the Department the premises occupied as a hospital close to the school. There was 'a forest reserve of some 1200 acres within a mile of the school, while plantations which already exceed 800 acres, together with a large forest nursery, are hardby'.[54] The first staff member was T. S. Hart, formerly of the Ballarat School of Mines, who was appointed Senior Master in 1913. Entrance to the school was by competitive examination for students between fourteen and sixteen years 'of sound health and good moral character'.[55] Regulations were gazetted in September 1914 by which trainees at the school were to be paid £48 in their first year, £52 in the second year and £56 in the third, £45 being deducted to cover board, lodging and attendance.[56]

In 1916, C. E. Carter became Senior Master, seconded by the Department of Public Instruction, in which he was a high-school teacher. During his first few years at Creswick, Carter completed a Diploma in Education and a degree in agriculture at the University of Melbourne.[57] Conservator Mackay urged on government 'the absolute necessity of the early appointment of a thoroughly trained instructor in forestry'[58] and the new Commission, which was appointed under the Forests Act of 1918 and was 'impressed by the anomaly of a Forest School with no qualified instructor in forestry', obtained Cabinet approval to send Carter to Yale University School of Forestry to study for the two-year postgraduate MF degree in 1920.[59] He resumed duty as Headmaster (Principal) at Creswick in 1923, revising the curriculum and enhancing its forestry components.[60] K. V. M. Ferguson was appointed Assistant Master in 1925.[61]

During these developments, the subject of the education of professional foresters in Australia had been a live topic of discussion amongst the heads of the forest services and had crystallised by 1920 in broad agreement of the need for a national school and for its location in New South Wales. While occasional suggestions were made that Creswick might be upgraded for this purpose, it seems not to have been seriously contemplated. The Victorian Forests Commission by 1920 was firmly behind the idea of a national school. Owen Jones, the Chairman of the Commission, regarded the

> establishment of one thoroughly efficient school in Australia for the professional training of forest officers [as] . . . an urgent necessity. The small school at Creswick has never laid claim to impart more than an elementary training in the subject, nor has it been supplied with the staff requisite for more advanced work.[62]

Indeed, he had been appointed by the 1920 Interstate Forestry Conference, along with N. W. Jolly, to discuss the establishment of the national school at the Premiers' Conference in May of that year.

By 1921, the Victorian Government had agreed to the national school in principle and was delaying its guarantee of a definite number of students annually, which was thought to be an essential precursor to the actual establishment of the school, only because of 'general financial stringency'. When the Australian Forestry School finally opened at Adelaide in 1926, the first intake of students included two graduates of Creswick, the intention being to select 'the most promising of the students passing through Creswick for a higher training in forestry at the Australian Forestry School'.[63] The commission also made Carter available to the Commonwealth Government for appointment as one of the first two lecturers of the Australian Forestry School at Canberra in 1927. Ferguson succeeded him as Principal until the following year, when he in turn was succeeded by E. J. Semmens.

The acceptance of Creswick graduates to the Australian Forestry School course was an exception to the general prerequisite of an approved two-year course at a university and strong views were held by various involved parties on the question of the equivalence of the one to the other. The reconciliation of these views, which might have been possible under other circumstances, was hindered by partisan discussions at the Empire Forestry Conference held in Australia in 1928. The result was that the Commission resolved to continue with Creswick as the basic centre for training its professional officers, to phase out the relationship with the Australian Forestry School, and to seek a closer relationship with the University of Melbourne. From 1931, no more Creswick graduates went to Canberra; instead, they went to Melbourne University, which had granted recognition of certain subjects at Creswick toward a BSc degree.[64] In 1942, the Commission and the university negotiated an arrangement whereby the university would grant a BSc in Forestry to selected students who completed an approved two-year course at the university following an approved three-year course at Creswick and, in the following year, a School of Forestry was established within the Faculty of Science in the university to teach the two-year course there. K. V. M. Ferguson was seconded to the university by the Commission in 1944 to act as Senior Lecturer. J. H. Chinner was permanently appointed to the position in 1949.[65] The degree of BSc in Forestry was already available to students who completed the first two years of the university BSc degree followed by the two-year diploma course at the Australian Forestry School and successfully submitted a dissertation on an approved topic to the university.

During the 1950s, attempts were made by both the Commission and the university to establish a closer relationship between the Creswick School and the university, but these were not successful. Towards the end of the decade, all the universities in Australia began to reconsider the special relationship which existed between them and the Austra-

lian Forestry School and this, along with other matters of concern, prompted the University of Melbourne to look at its relationship with Creswick. As a result, soon after the Australian Forestry School was incorporated in the Australian National University as a Department of Forestry in 1964–65, Melbourne University established a complete four-year course for the BSc. For.,[66] at the same time retaining the arrangement with Creswick whereby its graduates of three years' standing could complete the degree with two years in the university's School of Forestry. Until 1969, it also retained the old arrangement with the Australian Forestry School whereby its undergraduates of two years' standing could obtain a degree by a further two years in the Australian National University Department of Forestry. The arrangement with Creswick was, however, still not a satisfactory solution to the problems of Melbourne University's School of Forestry and in the early 1970s further attempts were made to reconcile the respective views of the Commission and the university on the role of Creswick. These were not successful and in June 1973 the university amalgamated the School of Forestry with the Faculty of Agriculture to form the Faculty of Agriculture and Forestry, changing the name of the degree to Bachelor of Forest Science and providing for the degrees of Master of Forest Science and Doctor of Forest Science. At the same time the arrangement whereby Creswick diplomates could complete a degree with a further two years' study at the university was maintained.

Towards the end of the 1960s, the role of Creswick came under the scrutiny of education funding authorities. Prior to 1967, it had been wholly funded by the Victorian Government through the Forests Commission, which was responsible for its administration. With the development of the Colleges of Advanced Education at this time and assumption by the Commonwealth Government for their funding, the Commonwealth Commission on Advanced Education looked critically at small single-discipline institutions like Creswick and saw them as being more efficient if they were amalgamated into large multi-disciplinary institutions. It indicated in 1975 that it was not prepared to recommend the continuation of funding for Creswick as a separate institution after 1978 and pointedly proposed the amalgamation of Creswick with the Ballarat College of Advanced Education. However it deferred termination of funding for one year to allow negotiations to be made about the future of the school.[67] A proposal for the merger of the school with the Victorian Institute of Colleges, which it recommended should be established to coordinate technical training in the state, had been made by the Martin Commission in 1964.[68] The Forests Commission was reluctant to accept either suggestion. The Victorian Division of the Institute of Foresters favoured the merger of Creswick with the University of Melbourne.[69]

The group of students successfully completing the three year course in 1978 included the first women to enrol at the school.

In January 1980, by agreement between the Commission and the university, the school was affiliated with the university to provide a four-year course for the Degree of Bachelor of Forest Science composed of two years at Creswick and two years in the Faculty of Agriculture and Forestry at the university. In 1982, the status of the forestry part of the faculty was increased by the appointment of its first professor, I. S. Ferguson (as Professor of Forest Science). The end of 1980 saw the graduation from the school of the last group of its three-year diplomates, bringing the total since its inception to 500.

Section 9 of the Forests Act 1907 required that a person being appointed or promoted to a position in the Department must (with certain exceptions) pass an examination prescribed as a qualification for that position and, to that end, it prescribed the appointment by the Governor of 'fit and proper persons to act as examiners'. So there came into being in July 1908 a Board of Examiners, with A. J. Ewart (Professor of Botany at the University of Melbourne) as Chairman, which in one form or another has played a leading role in forestry education in Victoria to the present day. With the establishment of the Creswick School, the government decided to involve the Board closely with the school and it was reconstituted for the purpose, with Ewart continuing as Chairman until his death in 1937. As the scope and scale of Creswick's academic activities expanded, so did the Board's involvement with them, and its membership gradually increased from the original four to eleven in 1963, when, by new regulations under the Forests (Amendment) Act 1962, its name was changed to the Board of Forestry Education.

Until 1969, the name of the award issued to students successfully completing the three-year course at Creswick was referred to as the Associate Diploma of the School of Forestry Creswick. In that year, the name was changed by regulation to Diploma of the School of Forestry Creswick. In 1949, a senior award of Diploma of Forestry (Creswick) was created for Associate Diploma holders who, after serving for three years as an officer of the Department, submitted an acceptable thesis on an approved forestry subject to the Board. Subsequently, the name of this senior award was changed to Diploma of Forestry (Victoria), and in 1980, with the cessation of the three-year Creswick course, the Board decided to keep the award of the Dip. For. (Vic) open until 1990 to allow eligible Creswick diplomates the opportunity to gain it.[70]

CHAPTER 6
South Australia

Early Settlement

'South Australia was founded on faith and a formula'.[1] The 'formula' was that of Edward Gibbon Wakefield, whose theory of colonisation was the practical basis for the settlement; and the 'faith' was the conviction of many of its founding fathers and early settlers that in South Australia lay the hope for a new colonial society, liberal in its ideals, government and economic structure — a great step removed from the convict associations, autocratic government and penal economy of New South Wales and Tasmania. 'Faith and a formula' were equally apposite to the establishment many years later of the coniferous plantations which form the forest wealth of the state today; but forests and the supply of timber played no part in the selection of Adelaide as the site for first settlement in 1836 nor did local timber play a great role in the establishment of the city. Of all the states, South Australia was the least endowed with native forest useful for the production of timber within easy reach of the early settlements and so never experienced the destruction of native forest to the extent the other colonies did. The early settlers tended to favour the flat, open woodland country which provided easy grazing on the native pastures between the trees and allowed reasonably easy clearing for cultivation. Nevertheless, the limited tall stringybark (*Eucalyptus obliqua, E. baxteri*) forests within reasonable reach of Adelaide fell readily to the shingle and paling cutter; red and blue gum (*E. camaldulensis* and *E. leucoxylon*) were converted to construction and fencing material; and mining timber and firewood demands were satisfied by whatever was handy. A licensing system was established within a few years of the colony's foundation and subjected to continual amendment to make it more rigorous, but it lacked the necessary policing to make it effective.[2] The movement of settlers out of the city to the country, though slow in the first decade of the colony's existence, gathered pace in the next two and, by the late 1860s, people both in and out of government had become concerned at the rate at which the limited forested land was being cleared and at the lack of any concern for future supplies of wood.

The Beginnings of Forestry

Although individual efforts by early German settlers may have had some influence on local arboriculture,[3] formal forestry in South Australia owes its beginnings to the fortunate coincidence of two energetic, enlightened and concerned men, Surveyor-General G. W. Goyder, who played a large role in land use and the general development of the state in the latter half of the nineteenth century, and F. E. H. W. Krichauff, a member of the South Australian House of Assembly from 1857 to 1890. Reacting to the alarming rate at which the already limited tree cover was being removed, Goyder was instrumental in having Krichauff move a Return to Order in the House of Assembly in September 1870:

> as to what is the best size of reserves for forest purposes, and where they are to be made, to recommend the best and most economical means of preserving the native timber thereon, and of planting or replanting the reserves as permanent state forests; and what are the most valuable indigenous or foreign timber trees, having in view as well as supply for public purposes, also an annual revenue from the sale of surplus timber.[4]

Under this order, one report was presented by Goyder with recommendations on the size and location of reserves (very much those which the Department manages today), and another report was presented by Dr R. Schomburgk, Director of the Adelaide Botanic Gardens, which included recommendations on species and planting locations, on a scheme to encourage landholders to plant trees, on the establishment of forest reserves and the appointment of two or three men 'who have a knowledge of forest culture'.[5] As a result, the government in 1873 passed the Forest Trees Act No. 26 which had been introduced by Krichauff, authorising a bonus to landowners who planted and maintained trees and the right to claim it as a property improvement. (There was, in fact, very little response to this and in 1881 the government substituted for it a scheme of free distribution of trees which lasted until 1924, when a small charge was made for them, more than eleven million trees being distributed to more than sixty thousand landholders over the forty year period.)[6]

Goyder followed this Act with further reports pressing the necessity for reserves and specifying areas worthy of reservation, recommending the establishment of nurseries, nominating planting regimes which were expected to yield a considerable profit, and recommending the appointment of an officer, 'thoroughly and practically acquainted with forest culture in all its branches', as Conservator of Forests.[7] Following a further resolution moved by Krichauff, the government passed the Forest Board Act No. 8 in November 1875, the date now taken to be the establishment of the forest service.[8] The Act

provided for the appointment of a Forest Board, the establishment of reserves closely following the recommendations of the Parliamentary Return of 1870, and further reservation of crown land. The Board was to consist of five members with various powers, including the management of the reserves (totalling about 80,000 ha), the administration of the 1873 Forest Trees Act, and the appointment of a Conservator and other necessary officers.

Charged with the responsibility of promoting the protection and regeneration of the native vegetation and with demonstrating the practicability of forestry, the Board (with Goyder as Chairman from the outset until it was abolished in 1882)[9] drew up prescriptions for the conservation of the native vegetation and for the establishment of plantations and then set about implementing them immediately. Nurseries were established at Bundaleer and Wirrabara in the north and at Mount Gambier in the south-east. The first planting, of various pines and eucalypts, was carried out at Bundaleer in 1876 and, by 1881, annual planting was being carried out at all three centres.[10] Radiata pine (*Pinus radiata*, then known as *Pinus insignis*) was included in the trials on the recommendation of Edwin Smith, a Scots nurseryman and Goyder's brother-in-law, who had also assisted him in recommending the reserves and whose influence N. B. Lewis suggests 'may well be reflected in the sound forestry principles which the Forest Board set down as its guidelines from the outset'.[11] By that time, radiata (Monterey) pine would have been familiar to some South Australian arboriculturists, an avenue of them having been established in the Adelaide Botanic Gardens in 1866 (most likely from seed supplied by Baron von Mueller, then Director of the Botanic Gardens, Melbourne).[12]

The First Conservator

As first Conservator, the Board chose J. Ednie Brown, aged twenty-eight,[13] who took up duty in September 1878.[14] As a member of the Scottish Arboricultural Society, he had won prizes from it for reports on the forests and forestry of North America.[15] Goyder was keen to see some of the North American species tried and looked forward to Brown's arrival:

> The Board has secured the services [as Conservator] of Mr. J. E. Brown who is hourly expected in the province: the son of Dr. Brown of Edinburgh, celebrated for his knowledge and work upon forestry. His son is highly recommended and from the experience he has already had with his father in Scotland, Canada and elsewhere, satisfactory results are anticipated.[16]

Brown quickly demonstrated the energy and arboricultural knowledge which was to characterise his years as the first Conservator of

three states. Two weeks after taking up his appointment, he had visited Bundaleer and Wirrabara Forest Reserves, inspected them thoroughly with a keen eye and presented to the Board a voluminous and detailed report on them.[17] In less than eight months, he presented his first annual progress report, 'a document of considerable length', ably and attractively written, not only reporting on the reserves under the Board's control but also discussing many matters of importance to conservation of forests. He also took the opportunity to make known at large his own views on these subjects. One of these was the 'influence of forests upon climate'. Brown saw trees as fertilisers of the soil, preventing evaporation, preventing sudden floods, providing amenity and being purifiers of the atmosphere. He also considered that the effect of a forest was to increase precipitation in its vicinity and to spread the rainfall more evenly over a year. Goyder could not let this latter view pass. He made four formal objections to the adoption of the Conservator's report, three of them of no great moment, and he was at pains to state that his objections were 'not in any way intended to reflect upon the Conservator, in whose ability and assiduity I have more than confidence'. But, while agreeing with many of Brown's items of the influence of forests upon climate, he dissented 'from the view that forests tend either to attract or equalise the rainfall'.[18]

It was a point of considerable importance to both men. Brown's views led him to push his planting further and further out into the arid areas to test the capacity of a wide range of species over a wide range of South Australian conditions, but no doubt also aimed at 'equalising the rainfall'. Goyder held firm views on the importance of isohyets in defining land use, as witness his recommendations of the 'fourteen inch rainfall line' as the limits for wheat growing. Goyder saw the subsequent run of good seasons, which stimulated a demand by settlers for further opening up of the wheatland area, as mere coincidence to Brown's proselytising and stiffened his opposition to it. The clash on this set up tensions which eventually made the Board unworkable.[19] In January 1882, the three unofficial members resigned and the government decided that the operations previously conducted by the Board would be more effectively carried out by the Conservator under the Commissioner of Crown Lands who would be constituted Commissioner of Forest Lands with all the authority of the old Board.[20] This was formalised in the Woods and Forests Act of 1882. It replaced the Forest Trees Act, which had been enacted in 1878 to consolidate the original Forest Trees Act of 1873, and amendments to the Forest Board Act. Under regulations gazetted in April 1883,[21] a Woods and Forests Department was created, to be headed by Brown, who was to be responsible to the Commissioner of Forest Lands.

Brown may well have had something to do with the new title for he comments on the use of the same title later, when a similar organisation was set up in Western Australia, that it was an appropriate one in the circumstances because the government had expressed its intention to establish 'woods' of exotic conifers which that colony (Western Australia) lacked to support its 'forests' of native eucalypts. He continued in office until 1890, when he resigned to become Director-General in New South Wales.

It is difficult to get his contribution in perspective. D. E. Hutchins could hardly have been more derogatory without being defamatory:

> forests in South Australia suffered for many years owing to [his] bad organisation and injudicious planting . . . the best that can be said in [his] defence . . . is that he was not a professionally trained forester . . . in his reports I see chiefly good intentions, platitudes and forest truisms, with some faulty arboriculture; of modern forestry, little or nothing. Of the real forest problems with which he was faced, there seems to have been no perception . . .[22]

Lewis, on the other hand, comments:

> Despite travelling widely — a slow process in those days — Brown found time to write excellent technical reports and to produce, during his first year in office, a revised set of Forest Regulations to bring the exploitation of the native forest under control. His suggestions for the future management of [each] Reserve were clear and concise forerunners of the sophisticated forest working plans under which the State Forests are managed today. These included management of the native forests and woodlands . . . Many of what are today reasonable stands are due to the restorative management initiated by Brown.[23]

Even at the height of its internal difficulties in 1881, the Board saw fit to print his *Practical Treatise on Tree Culture in South Australia* and to distribute 2000 copies free and another 100 at a small charge. 'It was,' said the Board 'well received and reflected great credit on the author.'[24] His *Forest Flora of South Australia*, published in 1882, 'was a monumental work and it is a collector's item today'.[25] It was possible that, confident of his contention that tree cover induced rain, he pushed planting into arid areas, where it was in fact bound to fail and did. But the irregularity of rainfall which characterised his period as Conservator made it difficult to establish trees even in areas where in general they were likely to succeed. One year he was to report 'the best rainy seasons since the organisation of the Department'; the next, 'the worst season for plant growth both as regards rainfall and continuance of summer heat since my arrival in the Colony'.[26] Nevertheless, despite these failures, and to an extent because of them, his trials of a great number of species over a wide range of soils

and climate provided a real demonstration of which trees were likely, and which were not likely, to be of value for afforestation and reforestation. Seen against the size of the area for which he was responsible, the diversity of its soil and climatic conditions, and the methods of transport and communications of the times, the 3600 ha of exotic conifer and native eucalypt plantations which had been established by the time he resigned formed, by any fair criterion of judgement, a considerable arboricultural contribution.

'This Remarkable Pine'

Brown's place was taken by Walter Gill, an Englishman and forester at Wirrabara, in July 1890.[27] Conservator for thirty-three years, the only official acknowledgement of his contribution over this long period is the laconic record in the first annual report of his successor: 'The work carried out under his guidance stands as a monument testifying to duty well done and faithfully performed'.[28] Hutchins did him rather better: 'Mr. Gill is the doyen of Australian forestry'. According to Hutchins, following Brown's conservatorship, Gill had 'for many years, a task of extraordinary difficulty and delicacy'.[29] Lewis sees him as 'a very able Conservator and administrator'.[30]

Gill was particularly interested in doing two things, demonstrating the usefulness of the wood the Department was growing and speeding up the development of the plantations in the South-East Region, where large areas of suitable land were available. By the end of the first decade of his conservatorship, the arboricultural trials of the previous twenty-five years had demonstrated fairly clearly what could be grown where and that radiata pine had promise above both local and other exotic species as a producer of wood of good quality. Gill promoted exhibitions of articles made from native timbers and set out on a long campaign to convince a doubtful industry and public of the utility of the plantation conifers, particularly radiata pine. In an address to the fourth Interstate Conference in Perth, 1917, he described how he had a kitchen table made from a ten-year-old radiata from Wirrabara Forest in 1891 which was still in good order twenty-five years later; and he extolled the virtues of this species for a wide range of purposes — furniture, ladders, wheelbarrows, sides and bottoms of drays and waggons, butter boxes, house framing, floors and ceilings. To demonstrate the utility of the plantation conifers for fruit cases, he had had twenty-year-old stems of radiata and maritime pine sawn up for apple cases in 1902. He claimed that he had so convinced the fruit growers of the Wirrabara District that a small sawbench was set up at Wirrabara in 1903 to cut cases and that its success had prompted the establishment of further and better equipped mills at Bundaleer and in the South-East. He was particularly keen to get a market established for cases because this allowed the use of thinnings and the financial returns from milling them were so successful. He

concluded his detailed record of twenty-five years of utilising radiata pine to the conference rather indignantly: '[These] remarks . . . claim to be merely a plain statement of facts which form in themselves a complete vindication of the excellence of this timber against the unwarranted condemnation to which it has been so long subjected owing to the puerile ignorance of its detractors',[31] of whom there were many.

With confidence in the species, he promoted a vigorous planting program in the South-East, which he saw as having particular potential, though concern did creep into his annual report for 1914–15, where he discussed at some length 'the occurrence of a fungoid pest in the plantations at Mount Burr Forest which has attacked the Remarkable Pines [and] given rise to some apprehension during the year'. He considered that 'caution will be required in planting it in some soils in the south-east'. Many of the trees in the first few years of growth developed deformed trunks as a result of a disorder of the leading shoot. The causative agent was then thought to be a fungus. The sporadic occurrence and lack of positive identification of the disorder reduced confidence in planting radiata pine for some years, but in 1920 it was decided to resume full-scale planting because normal development seemed to take place subsequently above the point of deformation of affected trees and the tree did not appear to be affected again. It was not until 1939 that the disorder was found to be caused by a deficiency of zinc in the soil, which could readily be corrected by spraying a solution of zinc sulphate onto the foliage of the trees at an early age.[32]

Gill's term formally expired in October 1921 when he turned seventy, but the government retained his services until December 1923.[33] He had built a considerable plantation edifice on the pioneering arboricultural foundations of Goyder and Brown and had tried hard to demonstrate, in the face of opposition and prejudice, the great utility of radiata pine wood if it were given proper treatment. He was a very competent photographer and his photographs, which so profusely, aptly and handsomely illustrate the annual reports over his long period as Conservator, form a unique pictorial record of the activities and progress of an Australian forest service. He died in July 1929.[34]

On Gill's retirement, E. Julius became Conservator. He had joined the New South Wales service in 1908 and, prior to his appointment, had for three years been District Forester of north-west Tasmania.[35] He took up the conservatorship in January 1924 and retired in March 1935. It was an eventful period for planting and utilisation, and was climaxed by a Royal Commission of lasting significance to the Department.

The plantation program was given a considerable financial impetus in 1926 through an agreement between the British and Australian

Governments to assist migration from Britain by development projects in Australia which would provide both housing and employment. The South Australian government made a successful application under the Overseas Settlement Act for a loan of £358,000 for an afforestation program involving an annual planting of 2000 ha a year for ten years.[36] This planting target was quickly achieved and the program was completed on schedule. Ironically, despite the size and success of the project and the number of houses built by the Department 'so far as is known, only one migrant ever arrived for forest work'.[37] The planting program was also given considerable professional support in 1928 by delegates from overseas to the British Empire Forestry Conference, who inspected a number of the plantations. South Australia was commended for the program in operation and the hope was expressed that it would be further increased. The conference recorded one misgiving: In urging Australia to become self-supporting and recognising the value of radiata pine as an excellent means to this end, it:

> was not satisfied that Australia had found in this species a complete solution to her softwood requirements. The danger lies ... in the exacting habit of this tree i.e. in regard to soils, etc. and the liability to attack by insects and fungus diseases through the massing of great bodies of one species.[38]

The commercial possibilities of planting and milling, particularly in the South-East, also appealed to private investors. South Australian Perpetual Forests was incorporated in 1926 and within ten years had planted 2500 ha.[39] Other groups followed with operations spanning the border of South Australia and Victoria. The private programs were considerably reduced during the years of the economic depression but, aided by the migration scheme funds and special grants by the Commonwealth and State Governments for unemployment relief, the Department's program was maintained.

The first major attempt to market radiata pine for building purposes was made in 1918, when about 12,000 cubic metres of material thirty-three to thirty-six years old from Wirrabara plantation was sold to an Adelaide sawmilling firm. However, lack of experience in milling and handling it, and lack of a suitable method of seasoning the timber, led to adverse public criticism. As further supplies of large logs became available without attracting buyers and the standard of the product from thinnings being sawn by private millers failed to come up to expectations, the Department decided to extend its interest in the sawmilling and marketing business to justify its faith in the wood. Reorganisation was carried out and seasoning kilns were installed at the Wirrabara Mill in 1925–26. Although sales still proved slow for a while, they gradually improved,

especially with the support of the government's Architect-in-Chief and the Timber Merchants Association.[40]

By the end of the 1920s, the supply of logs becoming available from the plantations of the South-East, and the inability or reluctance on the part of private millers to take them, prompted the Department to further extend its milling activities and a start was made on the erection of a new mill at Mount Burr in October 1930. It was opened in May of the following year.[41] This mill featured the first Swedish gangsaw to be installed in Australia as a breaking-down unit for the conversion of logs to boards, drying kilns and seasoning prescriptions for a high-standard product, and the use of self-generated electric power.[42] There was at the time some opposition to its establishment. For example, Francis Kay, as forester in charge of Mount Burr, had written to the Conservator:

> The proposal to run a sawmill on thinnings from the young plantations at Mount Burr at this stage fills me with alarm ... If, therefore, a sawmill is established ostensibly for the utilisation of thinnings, it is sure to do one of three things. In its attempt to utilise inferior log timber it will probably go to the wall as a commercial enterprise, or damage the reputation of *Pinus radiata* timber for generations to come or it will rob the plantation of prime trees that should remain standing for the final triumph of the rotation and the credit of the broad project upon which so much loan money is now being expended.[43]

He and others were concerned that the supply of thinnings which was being used to justify a need for the mill would not prove adequate in quantity and quality and that inadvisable clear-felling would be necessary to keep it going. The government Classification and Efficiency Board was to comment later that this had in fact happened and thought the mill had been built 'five years too soon'.[44]

A Royal Commission on Afforestation

On 18 July 1935, the government appointed a Royal Commission on Afforestation, which was to have far-reaching effects on the Department, which carry over to this day. It had a long and complex background. Several senior foresters of the time were involved and their varying professional views and their personal interactions were a feature of the inquiry and critical to the commission's recommendations.

It was natural that the scientific inquiry being conducted by the Institute of Science and Industry in the early 1920s into the feasibility of producing pulp and paper from native and exotic trees in Australia should excite the interest of both government and private entrepreneurs in the commercial possibility of radiata pine in South Australia for this purpose. The Department's 1924–25 annual report records that:

> an inquiry was made re the possibility of a supply of 750,000 cubic feet of *Pinus insignis* per annum for a period of 15 years from the Mount Burr plantation for the purpose of manufacture of paper pulp. It was found by a forest valuation survey that by the annual exploitation of 288 acres the quantity could be supplied.

At the government's request, C. E. Lane Poole carried out a check of this assessment over nearly 800 ha at Mount Burr in 1926 with a party of Australian Forestry School students. He found the Department's estimates substantially correct and thus 'proved ... there is a sufficient supply of softwood to warrant the establishment of [a pulpwood] industry'.[45] In 1928, L. R. Benjamin and his co-workers showed that a light-coloured easy-bleaching pulp suitable for a wide range of paper products could be made from radiata pine by the sulphite process and that kraft pulp could be made from it practically equal in quality to pulp imported for the manufacture of kraft paper. Benjamin also made the point that, given sufficiently large an operation, kraft pulping and papermaking could be carried on conjointly in South Australia with greater economy than for either alone under the conditions of the time.[46] While this testing was going on, a call was made in Australia and Britain by the Government for offers to purchase about 500,000 cubic metres of radiata pine thinnings from the South-East over a period of fifteen years for paper manufacture.[47] The Committee on Australian Forestry of the 1928 Empire Forestry Conference had its doubts.

> [It] viewed the proposal to establish a paper-pulp industry in the South-East with apprehension in view of statements that the supply of thinnings not marketable for sawmilling is inadequate for the maintenance of a pulp industry. It is considered that proposals advanced in some quarters for the conversion of the objects of the working plan for these plantations from that of growing sawmill timber to that of growing pulpwood should not be given consideration unless the return from growing pulpwood will exceed in benefits to the State the results obtainable from growing saw timber.

In the event, no satisfactory response to the government's call was received by the closing date in September 1928. However, the government persisted with its efforts to attract industry, including Australian Paper Manufacturers, to the proposal and during 1932–33 officers of the Department and APM began collaborating in the collection of appropriate field data.[48]

In October–November 1932, Forester Kay of Mount Burr submitted to the Minister a scheme for a 'dual State and private company with dominant private directorate to control the paper industry in South Australia'. He advanced arguments for the superiority of an enterprise in which government was involved over one in which it was not.

His view was that the forests of the South-East 'were planted for the purpose of making money for the State and the writer, having been largely responsible for their creation, regards it as his business to attempt to show how the most money can be made out of them'. By his calculation the 'industry [making paper direct from wood] could readily pay three shillings stumpage per 100 sup. ft. for its timber requirements after sawmill reserves of the best logs, to the extent of 33 per cent, have been extracted'. His 'profit computation', which included an estimate of the profit as 35 per cent of capital outlay, which he saw being shared equally by the government and the company, had been made from 'information sought elsewhere'; and he saw the 'present paper manufacture industry [as] the monopoly of one firm which imports its pulp duty free from foreign countries' and thought it not unreasonable that it would not disclose 'exactly what it could afford to pay for its wood'.[49]

In December 1932, all the Department's operations were subjected to an intensive investigation by the government's Classification and Efficiency Board, under the Chairmanship of L. C. Hunkin, the Public Service Commissioner. The opening paragraph of the Board's report set the scene for its major findings:

> A stage has been reached in South Australian forestry operations where it has become urgently necessary to test the economic feasibility of the department's immense planting scheme by the commercial exploitation of the forest production. To continue the present scale of planting operations without sufficient proof of the suitability of our products for local market conditions, and their ability to command a ready market at a profitable price, is inviting financial disaster.

The Department had done an excellent job in its planting program, a sphere of operations in which it had obvious competence: 'in the performance of the common operations of a Forestry Department, the conservator and his staff have done very valuable work and are deserving of the highest commendation'. But the Department 'had only the vaguest ideas of disposing of its products as the areas matured, in fact, the Department has not now, nor ever had, any clear idea as to how the gigantic problem of marketing is to be solved' and 'the staff of the department was not adequate in either numbers or experience for the successful conduct of such [milling and marketing] operations'. The board exemplified this view with a long, critical discussion of the early problems of the Mount Burr Mill.

It was guarded on the matter of paper pulp:

> the manufacture of paper pulp in Australia on a commercial scale from local materials . . . [is] still very much in the experimental stages and . . . it is as yet impossible to forecast future developments. The profitable utilisation of softwoods, especially forest thinnings, for the

> manufacture of pulp would have such a tremendous influence on the economic aspect of our forestry operations that it became a matter of the utmost importance to have the question thoroughly investigated. The recent visit of, and conference with, representatives of the Australian Paper Mills is of the greatest significance and the outcome may conceivably supply the necessary proof of the economic feasibility of plantation forestry operations on a large scale.

It recommended that a Forestry Board 'consisting of three members be appointed to control and direct, subject to Government policy and the direction of the Minister, future planting policy, acquisition or disposal of forest land, and sawmilling and marketing activities'.[50] In March 1933, such a Board was appointed, composed of W. L. Summers (Secretary to the Minister of Agriculture) as Chairman, Hunkin and J. W. Wainwright (Assistant Auditor-General), who had also been a member of the Classification and Efficiency Board.[51]

Shortly before this, in January 1933, a conference was held at Mount Gambier of representatives of the government, APM and CSIR which set up several committees to report on various aspects of the wood pulp proposal. As part of the task of one of these committees, E. H. F. Swain, then a consultant (following the termination of his service with the Forestry Department in Queensland) under the joint commission of the South Australian Government and APM, submitted a report in October 1933 on 'The radiata programme in South Australia and economic thinning of the forests by the development of a pulp and paper industry'.

The members of the Forestry Board were determined to follow up the investigation which they had made as members of the Classification and Efficiency Board. In a report to the Minister in June 1933, the Board regretted to say that its further examination entirely confirmed its original conclusions about the 'absence of any intelligent balance between the planting policy and probable marketing possibilities'. It considered that the position demanded 'an early review of the extensive planting programme, especially in the South-East, particularly as the programme appears likely to be extended and accelerated for the purpose of providing work for the unemployed'. The Board saw South Australia with a large amount of surplus wood some years hence and argued that it was 'necessary to make every possible effort to secure the establishment of a pulp industry in the South-East'. In a further report in July 1933, the Board strongly recommended that no further planting be carried out in the South-East until the possibility of adequate markets was more definitely established.

Swain's report of October 1933, and a report by the Committee on Transport and Forests, suggested that more basic management data and a further report were necessary before firm proposals on the part

of the government and APM could be formed. In January 1934, he was recommissioned for this purpose with the assistance of a large team of field-workers and with the cooperation of officers of the Department. Swain saw the main purpose of the investigation as obtaining data appropriate to forecasting possible annual pulpwood yields, defining the distribution of pulpwood over the major plantations, and planning alternative operations for various potential pulpmill sites, all 'in conformance with sound silviculture'. Corollary purposes were the specification of thinning prescriptions so that pulpwood would be a by-product of silvicultural treatment and not vice-versa, the survey and mapping of site qualities, an assessment of the economics of the various site qualities as a guide to future planting, the provision of contour maps for planning transport, and obtaining information as to possible pulpmill sites.[52]

The Forestry Board continued to press the Minister on its concern over the planting program, especially as it thought that the only solution to a likely South Australian timber surplus lay in markets in other states, whereas in fact each state was developing its program in isolation. In June 1934, it urged the Minister to take steps to convene an interstate conference 'so that the planting policy of each State could be considered from the point of view of Australian production and consumption'. In August, the Board approached the other states on the matter. They liked the idea in principle, but in fact nothing happened.

The Board took the opportunity to push the idea, again without success, at a meeting of Commonwealth and State Government representatives convened in December 1934 by the Prime Minister to discuss forestry work to relieve unemployment.[53] By this time, the Board had also had an opportunity to examine Forester Kay's submission to the government in October–November 1932 and to discuss it personally with him. On this basis, it concluded: 'Mr. Kay had no technical knowledge of the subject, that he was unable to grasp the economic principles involved, and was incapable, through lack of ordinary business knowledge and commercial training, of realising the fundamental weaknesses of the case as presented by him'. The Board was 'of the opinion that the proposition in both essentials and details is economically unsound and not worthy of serious consideration if taken on its merits'. Nevertheless, it decided to examine the proposal properly to avoid causing any embarrassment to the Minister on this score if the proposal were submitted as an alternative to the agreement proposed between the government and APM when the latter was being debated in Parliament. To do this, it had obtained appropriate information from APM (some of it confidential) about costs and prices. On this basis, the board was 'satisfied that the [Kay] proposal is demonstrably unsound economically and cannot be regarded as being commercially feasible as submitted'.[54]

The proposed agreement between the government and APM referred to by the Board was formally introduced into the House of Assembly in early November 1934 as the Wood Pulp Agreement Bill 1934 'to ratify Agreement between the Minister of Afforestation and APM Ltd. and to provide for the carrying out of the Agreement and for purposes incidental thereto'. There were numerous clauses, but the main features were that APM was to utilise thinnings from the South-East forests for wood pulp at a mill to be erected in the South-East; APM was to bear all costs of thinning, transport and manufacture but to pay no stumpage; the profit was to be shared equally by the government and APM; and an amount of pulpwood was to be guaranteed. Two years (30 November 1933 to 30 November 1935) were allowed for joint investigation of the project.

After debate, the Bill was referred on 21 November to a Joint Committee of Members of the House of Assembly and the Legislative Council. Swain submitted his report on 'Pinus radiata plantations in south-east South Australia' on the last day of 1934, an enormous amount of work in the space of less than twelve months. It was immediately referred to the Joint Committee, which adjourned in March 1935 to allow officers of the Woods and Forests Department to check it. The committee began meeting again and examining witnesses on 10 June and in July wrote to the Minister for Afforestation saying it considered the whole matter of afforestation should be looked at and the inquiry broadened to allow this. As a result, on 18 July 1935, the government appointed the members of the committee to be a Royal Commission. Its findings were published on 17 November 1936.

Swain's report played a large part in the considerations of the commission. It was composed of more data than was available anywhere else. The first three 'disclosures' of his report were also couched in terms which could hardly fail to merit consideration:

1. The South Australian Woods and Forests Department is organised at present only as a planting service. It should be developed to embrace forest management in its research, technical and business aspects.
2. Lacking a thinning and forest management technique for profit, and pursuing a policy of forest extension to no industrial plan, on cheap land often too poor for the species, the State of South Australia is heading for financial disaster in its forestry investments in the south east.
3. There have been established in the south east some 47,000 acres of Pinus radiata plantations, of which approximately 20,000 acres have been classified by the Investigation at 31/12/1934 as ineffective and uneconomic. These areas should be written off at a cost of about £200,000.[55]

Although the first two comments were really saying little more than the Forestry Board had already said several times, the third was rather more startling. It is understandable that the Joint Committee sought the wider terms of reference and the stronger powers of a Royal Commission to inquire into them.

The first four of the commission's five terms of reference were directed at this general matter of afforestation.[56]

Reference I. 'The prospects of the profitable commercial utilisation of forest products derived from the State softwood plantations'.

The commission did not see the position with regard to the poorer land which had been planted as grimly as Swain did; and though it saw a surplus of sawn timber from the presently planted area, this was neither of the size or nature which had concerned the Forestry Board. The commissioners concluded:

> it seems that, unless the general position is adversely affected by abnormal conditions and tariff changes which cannot be foreseen, the utilisation of forest products derived from the state softwood plantations should result in the ultimate return to the State of the capital invested, together with compound interest and all other costs, provided that sound silvicultural practice and economic methods of exploitation are observed.

Reference II. 'Whether the present policy of annual plantings upon land held for afforestation purposes should be continued and, if so, to what extent'.

Since any further acreage would increase the surplus from the present estate, its financial success depended on selling the produce outside the state. The commission, having reviewed the present and likely future situation, particularly with regard to the other states, considered that:

> the present acreage of softwood plantations in South Australia might be economically extended to the maximum area of suitable land available for the production of *Pinus radiata*. This area . . . is estimated at 120,000 acres including land already held by the State, and, on the assumption that the balance can be acquired and that 40 years is the most probable economic rotation . . . [the commission recommended] . . . that subject to consideration as to prices of land discussed under Reference IV, the policy of annual plantings upon such land held or to be acquired for afforestation purposes as is indicated by a comprehensive survey to be suitable for the growth of softwoods should be continued to an extent approximating but not exceeding 3,000 acres, the species planted to be *Pinus radiata*.

Reference III. 'Whether any land at present held by the Government for afforestation purposes (including land already planted and land

intended to be planted) is unsuitable for the establishment of commercial forests. If so, what is the best economic use of any such land'.

The commission came down strongly with the view that 'no lands should be taken from the Woods and Forests Department except on the recommendation of the Conservator of Forests for the time being'. It instanced the case of a 9000 acre estate which, taken from the Department for other purposes, would have been better left with it for planting. With the exception of 10,000 acres which could be ceded to other purposes, it recommended the reserved area totalling 260,000 acres be retained, about 80,000 of which was commercially suitable for radiata pine; but it stressed that 'an exhaustive survey of soil and other conditions be made of all land planted with softwoods, or cleared or proposed to be cleared for planting, to determine the suitability of such land for the establishment of commercial forests of softwoods'.

Reference IV. 'Whether it is desirable that the Government should purchase or acquire or reserve any more land for afforestation purposes, and, if so, how much land and in what localities'.

In line with its finding under Reference II that the present acreage might be economically extended to 120,000 acres, the commission recommended:

> it is desirable the Government should purchase, acquire or reserve sufficient land suitable for the growth of *Pinus radiata* to provide a total planted area of 120,000 acres of effective radiata pine forests, of which it is recommended that not less than 16,000 acres be established in the Adelaide Hills, 4000 acres in the Middle North and the balance in the South-East.

The subject of Reference V, 'the commercial possibilities of the production in South Australia of timber for the manufacture of pulp for paper making, and the prospects of establishing a profitable wood pulp industry in South Australia', was understandably more controversial — at least that part of it relating to the proposed Agreement. The commission saw considerable benefits in the establishment in South Australia of an industry for the manufacture of pulp for papermaking — in the creation of employment, in maximising the production from forest land, and in providing a market for small logs — and it saw added benefit in a combined pulp and paper industry. Although the Wood Pulp Agreement was void because the option date had expired, ratification of the Bill could have been carried out with appropriate adjustment of the date had the commission come down in favour of the Agreement. But it did not, for various reasons centred mainly around the matter of thinning, which was the crux of the Agreement — whether it was essential to thin, the cost of thinning

and appropriate stumpage — and it was on this matter that the views of witnesses were at variance.

Swain's prescription was for a forty-year rotation, thinning at eight to thirteen years depending on site quality, with an intermediate sawlog felling of half the thinned stand some fifteen years later. The thinning (consisting of diebacks, double leaders, suppressed trees and trees too crooked to become profitable mill logs) would 'average 1000 cu. ft. per acre . . . a degree of thinning . . . essential to the production of the large trees . . . necessary if forestry is to be made profitable in the South East'. As to the disposal of the thinnings, they 'can be removed to the edge of the plantations and burned. Alternatively they can be used for pulpwood'. From present costs in the South-East, and the costs of comparable operations in Victoria and New Zealand, he estimated the cost of felling the 1000 cubic feet and snigging it to the break as not less than £6 per acre. He considered that clear-felling for pulpwood was not economical and recommended against it. The thinning prescription in the proposed Agreement was largely the one recommended by Swain. The Agreement was largely the work of the Forestry Board. The Board was 'of the opinion that thinning was essential to the economic success of the plantations'.

The commission came to the opinion that thinning was not essential to the profitability of afforestation in the South-East on the evidence of C. E. Lane Poole (Commonwealth Inspector-General), N. W. Jolly (recently Commissioner of the New South Wales service) and G. J. Rodger (recently appointed Conservator of South Australia), and on the results of operations in unthinned plantations in South Australia. In essence, the witnesses said thinning was certainly desirable but not 'economically imperative'. Swain had estimated the cost of thinning as not less than £6 per acre and emphasised 'the advantage of having the forests thinned at no cost to the State'. The Forestry Board did not subscribe to Swain's estimate but was of the opinion 'that the cost of thinning would be so heavy that it would be expedient to give away thinnings to the extent of 1000 cubic feet per acre provided the State incurred no expense in the extraction thereof'. Rodger, on the other hand, gave evidence that the cost of thinning was likely to be considerably less than Swain had estimated and the commission concluded 'that the cost of a proper silvicultural thinning as specified by the Conservator . . . would not be such a burden to the plantation that they would be unprofitable'. As to the value of the thinnings, the evidence of Lane Poole, Jolly and Rodger was to the effect that for a thinning to be effective, particularly one taking out 1000 cubic feet per acre, it would inevitably take out sawlogs and potential sawlogs, as well as the badly formed and suppressed trees, and that it should therefore attract stumpage. The same witnesses attested that the thinning proposed was too heavy too soon.

In considering 'the commercial possibilities of establishing a wood pulp industry in South Australia', the commission gave a firm opinion that sawlog production should be the main objective, that thinning should be done on a proper silvicultural basis, that such thinnings should have a value and 'should not be offered or supplied as pulpwood except at their value at the time of extraction'. It accepted the CSIR findings with regard to the feasibility of making kraft pulp from radiata pine as grown in South Australia and its equivalence with imported kraft pulp. There being sufficient wood available for a mill of economic capacity (40 tons per day production) and other essential materials fairly readily available, the possibility of commercial production therefore depended largely on costs of production and tariffs. The commission found difficulties in accepting both Kay's 1932 estimates of costs of production (which he submitted to it) and those of CSIR. But attempts by the commission to get information from overseas sources had been unsuccessful. There was no duty on imported kraft pulp, and although there might be a case for imposing a tariff to ensure preference for a local product, this depended on the extent of the tariff necessary and its effects on the selling price of kraft paper. The commission felt neither it nor those responsible for forming up the proposed Agreement were in a position to form an opinion on the commercial possibilities of a wood pulp industry. It thought 'a competent officer or officers of the Government [should] be detailed to investigate the economics of any such industry'.

The commission's summary of and recommendation on Reference V included the following:

> The planting programme recommended under References II and IV could provide annual cleanings and thinnings suitable as pulpwood in sufficient quantity to supply a pulp mill having a capacity of 40 tons daily . . . All [the] essentials [of a profitable woodpulp industry] exist in the South-East district . . . It is considered that the utilisation of cleanings and thinnings from the South-Eastern forests, though not essential to the economic success of plantings for the production of sawmill timber, would be of much advantage to South Australia if the cleanings and thinnings were extracted with strict regard for proper silvicultural practice. The Commission recommends that the volume of cleanings and thinnings suitable for pulpwood now available, and likely to become available each year, be ascertained by the Conservator of Forests; that negotiations be entered into with persons or companies interested in the utilisation of such pulpwood, and that timber should not be offered or supplied as pulpwood except at a stumpage rate commensurate with its value at time of extraction. It is desirable that any negotiations for the disposal of pulpwood should be brought to finality without avoidable delay as the decision would largely determine the spacing and other silvicultural considerations in subsequent plantings of *Pinus radiata.*

As ancillary matters, the commission also saw the need for more professional staff in the Department both for research and the supervision of operations, and it recommended a reorganisation of the accounting procedures.

Planting and Utilisation Expands

Julius retired as Conservator in March 1935. R. E. B. Brown, Secretary of the Department, acted in the position until G. J. Rodger took up the position in the following June.[57] One of the early graduates of the Adelaide University Forestry School who served in World War I, Rodger had worked in Western Australia, the Federal Capital Territory and New South Wales before his appointment to South Australia. He had only been in his new position a few weeks when the Royal Commission was appointed and he was immediately drawn into assisting with its investigations, particularly reviewing Swain's report. Until the report of the commission was presented in November 1936, policy decisions he might have otherwise made had to be held in abeyance. Once the report was presented and its recommendations accepted by the government, he had a 'green light' for continuation of the afforestation program at the rate of 1200 ha a year. For the first several years, this target was easily maintained, but manpower shortages during World War II reduced the program to around 800 ha annually over those years.

The commission's recommendations also provided the go-ahead for an expanded utilisation program. In view of APM's earlier interest and the commission's recommendation on Reference V, the Department commenced negotiations with that company for the utilisation of pulpwood from the South-East but 'an intimation from the company that they could not consider payment of more than a nominal "surplus waste" price for such produce prevented any advance being made'.[58]

Investigations into the pulping qualities of radiata pine continued, and in 1937 a shipment of young thinnings was sent to Europe, where comprehensive tests on a commercial basis showed the wood to be quite suitable for conversion to various kinds of pulp by both mechanical and chemical methods.[59] In February 1938, an agreement was signed with Cellulose Australia Ltd for the erection in South Australia within twenty-one months of a plant capable of manufacturing not less than 2500 tons of pulp per annum. The government was to supply 'up to 8 million s. ft. per year for 10 years', and the company was 'to take at 1s 6d. per 100 s. ft. standing not less than 2 million s. ft. per annum of wood from 3 to 6 inches in diameter' and convert into paper and paper boards in South Australia the whole of the wood supplied under the agreement.[60] Owing to the short supply of materials and machinery caused by the war, the establishment of such a plant could hardly have been carried out at a worse time;

therefore its completion to operational state on a site near Millicent by 1941 was a considerable achievement. In the same year, radiata pine pulpwood was turned into explosives (possibly for the first time anywhere in quantity), and supplies for this purpose to the Ministry of Munitions continued throughout the war years, rising to more than 20,000 cubic metres in 1942–43.[61]

When in mid–1938 there was no response to a proffered 10,000 cubic metres of radiata pine logs per year for ten years from Penola Forest, government approval was given to the Department to erect a mill, which began operations at Nangwarry in September 1940.[62] By this time, several private mills were operating on raw material from private forests supplemented by government supplies. By 1941, plants in Adelaide and at Mount Gambier were peeling radiata pine, particularly for match splints.

In 1939, the wide powers over the activities of the Department given to the Forestry Board when it was re-created in 1933 were reduced and the Conservator was appointed a member of the Board.[63]

For the early part of the war, the Conservator acted as Liaison Officer for Timber Control but became Deputy Controller for South Australia when a separate branch was established in the state in August 1943. The functions of Timber Control ceased in November 1945. Rodger resigned in March 1946 to become Director-General of the Commonwealth Government Forestry and Timber Bureau. M. A. Rankin acted as Conservator for a short period and then accepted a position with Australian Newsprint Mills at Boyer, Tasmania. A. L. Pinches was Acting Conservator until B. H. Bednall was appointed Conservator in January 1947. Like Rodger, Bednall was a 'home-grown' product, a graduate of the Adelaide University School of Forestry. He had been a member of the Western Australian forest service for twenty years prior to his appointment. When he retired in July 1969 (to an appointment as Chairman of the Forestry Board) after twenty-two years as Conservator, he recollected that over the period 'plantation areas have almost doubled, log production has more than trebled, as has Departmental sawmilling, while revenue figures have increased ten-fold'.[64] This was a bald statistical summation of a considerable amount of research, development and operational activity on the part of forestry and industry in those twenty years or so.

Because of the critical relationship between the health of the crop and its productivity, the Department was continually sensitive to the problems of nutrition that might reasonably be expected given the comparative infertility of the sites. It had lived with the 'die-back', which Gill had first recorded in 1914, for twenty-five years until, as a result of the earlier research (led by Stoate, and in which Bednall had also been involved) into a similar problem in Western Australian plantations, the spraying of a zinc salt onto the foliage at an early age was found to be effective in countering the disorder. Nutrition was

one of the major tasks allotted to the research station established in association with the Commonwealth Government at Mount Burr in 1937–38; and, after the war, the Department began nutrition investigations on a broad scale aimed at successful afforestation of the large area of marginal country becoming available to it. The Department was always aware of problems that might arise in any of the wide range of sites in which it was seeking to establish radiata pine, and, in the intensive, painstaking program of data-collection for yield regulation, it had an excellent in-built monitoring system to pick such problems up.

In the 1953–54 annual report to Parliament, Bednall first drew public attention to 'an interesting problem of possible site deterioration on a second rotation crop . . . on the Mt. Burr Forest Reserve' and J. Thomas took the opportunity that year, while on a Russell Grimwade Scholarship to Oxford, to look at problems of a similar kind that had been recorded many years earlier in stands of spruce on certain sites in Western Europe. It was not the first intimation of a possible problem. There had been concern for some time about a possible reduction in production in second rotation stands, relative to the first rotation stands on the same site, based on visual impressions; but it was not until the mid-1950s that sufficiently reliable assessment of the volumes of the successive crops on the one spot could be made for firm conclusions to be drawn. From that time on, as much staff effort as could be mustered was directed to determining how general the problem was and what might be done about it. It looked as if there might be an average decline in productivity of the order of 20–25 per cent in the sites that were involved. This had serious implications for the fine balance the Department was striving to establish between the supply of wood and the demands of an expanding, highly capital-intensive processing industry. The matter received continual reference in subsequent annual reports. In 1964, a conference was convened at Mount Gambier at which representatives from the Australian and New Zealand forest services and research organisations discussed the problem and in 1965 A. Keeves summarised the extent of the problem in a paper to an IFA Conference in Hobart. In 1968, Bednall brought the matter to international notice in a paper to the ninth British Commonwealth Forestry Conference in India.

Because of the influence of stand manipulation on the kind and flow of product, this was the other important aspect of management during this period. Out of the welter of conflicting views by various expert witnesses regarding the need for thinning the South Australian plantations (and this was really the main motive of the inquiry), the Royal Commissioners of 1935 came to the conclusion that thinning was not essential to the economic production of saw timber but that it would be 'of much advantage to South Australia if the

cleanings and thinnings were extracted with strict regard for proper silvicultural practice'. The fact was, of course, that very little was known at that time about the effects of thinning radiata pine in South Australia — or anywhere else where it was grown for that matter. Some of the produce for many years past was from 'thinning' in the sense of the removal of some of the trees rather than a clear-felling, and a few experiments had been conducted. However, although the Conservator in his annual report for 1933 saw it as 'being recognised that the forests must be thinned if we are to obtain large dimension timber in a reasonably short period', there were many who thought it might be unnecessary in such a fast-growing species. However, the commissioners sensibly implied in their recommendation that the Department should establish just what that 'proper silvicultural practice' for the plantations should be, and it lost no time in extending the establishment of sample plots (started in the investigations which formed the basis of Swain's report to the Joint Committee in 1934) to compare the development of unthinned stands with stands thinned at various ages to various densities.

Jolly, who had completed his service with New South Wales, became a consultant to the Department and directed the work on growth and yield until his death in 1954, when it became the responsibility of N. B. Lewis. With all the pressure on it, arising out of the investigations of the 1930s, for the efficient exploitation of the plantations, the Department badly needed mensurational tools for its management planning and, with what data he could muster, Jolly produced a yield table for unthinned stands in 1941 based on what permanent sample plot data were then available. In 1950, from the information that had accumulated from the silvicultural experiments begun in 1935, he produced a tentative thinning schedule.[65] In 1953, Lewis prepared a provisional yield table giving total production for thinned stands to thirty-six years of age based on Jolly's thinning schedule.[66] However tentative at the upper age limits, and continually subject to revision as data accumulated from more and more thinning trials, these two yield tables put the Department into a position where, for the first time, reasonably reliable assessments of the growth and yield of the present and possible future resource could be made, and the harvesting and processing could be planned with some assurance.

From that time, Lewis persisted, often with limited support, in espousing the critical role of thinning in the 'proper silvicultural practice' which the Royal Commission had enjoined on the Department. Aided by a study of thinning in Western Europe and other parts of the world as a Russell Grimwade Scholar, he extended the program of silvicultural work towards a clear definition of the regimes that would best satisfy the objects of management, set by State policy, within the constraints of the great range of edaphic and climatic

factors which characterise the plantation estate. In 1963 he produced for this purpose a guide to the 'Optimum thinning range of *Pinus radiata* in South Australia',[67] which was a major contribution both to local practice and to coniferous plantation management in Australia generally. By this time, the success of the earlier thinning schedules in providing the maximum amount and highest quality of the whole range of forest produce (sawn timber, round timber and pulp wood) was evident to anyone who had doubted the value of thinning. The flexibility of Lewis' guide was evidence of the practicability of thinning, an assurance that was of particular value to field staff at the time. As the effects and implications of the second rotation problem became clear, the Department decided to reduce the amount of clear-felling and to draw the yield from thinning as much as possible. Given the enormous diversity of age-stand density combinations which, for numerous historical reasons, characterised the estate, and given the need to thin the older stands which would otherwise have been left unthinned until the end of the rotation, prescriptions for thinning were required whereby thinning could be carried out without loss of growth and without the risk of wind damage to which certain areas of the South-East were susceptible. The 'optimum thinning range' provided these prescriptions.

Along with the steady expansion of the resource during this period went a steady expansion of processing. In 1952, the government approved a departmental proposal for the erection of a large sawmill adjacent to Mount Gambier township for the production of board and fruit cases, with an intake of 70,000–90,000 cubic metres per year and incorporating a power plant to burn mill waste for electricity production. The mill was in production by October 1957 and, by the time of its official opening in May 1959, it had already exceeded its production target. Although it was the largest softwood sawmilling complex in Australia, it was only one of a line of departmental sawmills, which were largely the creation and responsibility of K. W. Ingram from the time he joined the Department in 1934 until his retirement in 1965. Over that period, much of the technical and economic success of the processing wing of the Department, and the contribution of utilisation to the development of the plantations through the matching of technology to the silvicultural needs of the crop, was due to him.

In the private sector, South Australia Perpetual Forests (SAPFOR) opened a major sawmill at Tarpeena in 1958; APCEL Ltd (a joint venture between APM and Cellulose Australia Ltd) began the manufacture of tissue papers from wood pulp near Snuggery in 1960; Coreboard Ltd, a subsidiary of Softwood Holdings, began production of extruded particle board at Mount Gambier in 1957; Panelboard Pty Ltd began production of flakeboard there in 1960; and a further particle board plant was opened by Softwood Holdings in 1967.[68]

The preservation of radiata pine railway sleepers in 1936 was shown by 1948 to have been quite successful and a minor industry started around this use. Post-war demand for fencing materials prompted the Department to install a pilot plant at Penola in cooperation with CSIR to produce treated posts, to be followed by commercial firms in the late 1950s and a further departmental plant at Mount Gambier. Subsequently, several sawmills in the region established plants for pressure impregnation of both sawn and round timbers. The supply of treated transmission poles began in the 1960s though trials as early as the 1930s had shown their success in use. One of the most important developments of the period, in which Bednall played a critical part, was the establishment in 1966 of a cooperative arrangement between the government and private forest owners to ensure a regular supply of wood to the extensive integrated industry which had by that time developed in the South-East.[69]

Like any forest owner with a heavy investment in broad-scale monoculture, the Department was at all times aware of the vulnerability of its forests to attack by insects or fungi, and the discovery of the wood wasp *Sirex noctilio* in radiata pine forests over the border in Victoria in December 1961 was disturbing. However, a comprehensive aerial and ground search of the main plantation areas failed to find any occurrence of it in South Australia. (Unfortunately, twenty years later, *Sirex* appeared in plantations at Penola and Comaum, and careful monitoring of the effects of biological control on it began.) Also, like any landowner with a flammable crop spread continuously over large areas, the Department was continually alert to the need for protection against fire, and it built up, in conventional fashion, appropriate pre-suppression and suppression measures. The success of these, however, depended very largely on the cooperation of all land users and a feature of the period was the establishment of fire-fighting organisations in the South-East on a regional basis, in which A. J. Sorby Adams played an outstanding part.

Over the years, various amendments were made to the Act which created the Woods and Forests Department in 1882, and these were consolidated in 'An Act to make further and better provision for the creation and management of State forests and matters incidental thereto' in 1950. This was further amended in 1956 in regard to the size of membership of the Forestry Board.

The 1970s

Bednall was succeeded by another 'home-grown product', J. Thomas. A graduate of the Australian Forestry School and a Commerce Diplomate, he had served the Department in various positions and localities, commanded the 2/1st Forestry Coy, AIF, in World War II and had been Russell Grimwade Scholar to Oxford in 1954. On his retirement in 1975, V. M. Healy, who was Assistant Conservator at

the time, acted as Conservator until 1976, when P. M. South was appointed to head the service with the new title of Director.

By the mid-1950s, the Department had reached the target of 50,000 ha of plantations which the Royal Commission had recommended twenty years earlier. It thought there might be 70,000 ha, mainly suited to radiata pine, in the area reserved to it at the time; and an ultimate target of '300 square miles' (about 80,000 ha) was frequently mentioned as a possibility. By the mid-1960s, just what the Department might realistically aspire to, as far ahead as could be seen, was becoming much more clear. Its responsibility was also clear. As it began to say each year in its annual reports to Parliament, its main purpose was 'to implement the State Forest Policy', the main elements of which were:

1. That, within that one per cent of the land area of the State which can support softwood growth, and consistent with other appropriate usage thereof, the maximum area of thrifty softwood plantation forests is established and maintained so that —
   (i) the wood needs of the State are met from within the State so far as is practicable;
   (ii) there is a wood resource within the State capable of supporting indefinitely a stable wood-processing industry.
2. That the productivity and usage of this plantation resource is continually improved with the maximum continuing yield of wood being the primary aim but within a context of such multiple use as is consistent therewith.

There was a continuing and increasing demand for wood. In the circumstances, it was essential for the Department to determine just what the long-term sustainable yield would be in terms of the ultimate area of plantation and to prescribe a short-term yield from the presently planted area that approached the former as fast and as closely as possible. The yield should be in assortments appropriate to the wide ranging demands — from tissue paper to high-quality lumber. It should also be the maximum possible.

To the last of these terms there hung the obvious question mark of the 'second rotation problem', which was far from general but, in reducing production by amounts varying from a quarter to a third in cases spread over the whole range of site quality, it formed a disquieting threat, especially in the absence of any clear indication of the cause of the problem or the means of correcting it. The problem of gaining the most wood from the land was not, of course, new — the 'marginal sites' had long been a focus for intensive research. About three-quarters of the plantations are on yellow podsolised sands, and while the growth of radiata pine has varied from very good to satisfactory on two-thirds of this area, the growth on the other third, and on the white podsolised dune sands which make up the other

quarter of the total plantation area, has varied from marginally satisfactory to unsatisfactory.

From the mid-1930s, experimental work was begun by the Department, in association with the work in Western Australia on similar problems, to try to raise the productivity of these marginal sites by the application of various nutrient elements; and assistance in this work on nutrition was one of the major tasks of the research station established in association with the Commonwealth Government at Mount Burr in 1937–38. After World War II, the Department expanded its experimental work considerably in view of the large area of marginal land which the government was offering to it. Most of this work was directed at the well-drained component of the marginal sites, which had the greater potential for improvement, and, as R. V. Woods has outlined,[70] the results of this work in the 1970s came increasingly to bear on the second rotation problem. By the end of the period, though no claim could confidently be made that the problem had been completely solved, the combination of improved methods of site preparation, control of competing vegetation by herbicides, application of various fertilisers, and use of genetically improved stock from seed orchards gave strong evidence of a restoration of productivity to something like first rotation levels and reasonable promise that the threat of reduced yield could be avoided to a large extent.

Increasingly public demand was for high-grade constructional lumber from the outer wood of large logs, and a major part of the wood-processing industry, which the Department was charged with supporting by its wood resource, was dependent on a continuous supply of pulpwood. Thinning regimes to provide this wide spectrum of assortments were thus fundamental to the first element of State policy: that the state's wood resource meet the state's needs as far as practicable and support a stable wood-processing industry indefinitely. These thinning regimes were well provided for in Lewis' 'optimum thinning range'. During the 1970s, this was expanded to an 'optimum thinning guide', in which an optimum range was defined for each of the top five (of the standard seven) site-quality classes.

For the estimates of the yield that might be sustained in the long-term from the ultimate plantation area and the prescriptions for the short-term permissible cut from the present resource, the Department developed a sophisticated, computerised yield-regulation system based on the work of the previous forty years:[71] a vast amount of high-quality measurements of growth and yield; a classification of site productivity; methods of estimating tree and stand volume; and the prescriptions for silvicultural treatment from time of establishment to the end of the rotation. It was an outstanding piece of integration, to which many people had made a contribution over the years, but was to a large extent attributable to N. B. Lewis, A. Keeves and J. W. Leech.

One clause of the Department's policy requires:

> That, within lands under the care, control and management of the Woods and Forests Department, sufficient generally forested lands or native forest vegetation is maintained and conserved to provide a range of natural habitats of indigenous animals and plants thereon, for such of the protective, scientific, recreational and aesthetic needs of the community as it is practicable to provide from time to time.

For this purpose about 25,000 ha of the original forest reserves have been maintained as native forest or woodland. Very little of it is used for wood production.

In the early 1970s, the South Australian Government began planning a new city, to be called Monarto, about 60 km east of Adelaide. Most of the extensive site for this new city had had a vegetative cover originally but clearing, particularly of the arable parts of it, from the middle of the last century onwards had left the area generally devoid of native vegetation except for a scattering of relict patches. The city planners felt that a forested environment was the best within which to carry out the new urban development and the Woods and Forests Department, with its years of local arboricultural experience, was a natural choice to provide it. In 1974, the Department began to establish nurseries and to carry out planting on a broad scale in a reforestation project unique in Australia.[72] But by the end of the 1970s, for a number of reasons, the whole concept, planning and establishment of the new city had been abandoned by the government.

The First Hundred Years

In November 1975, the Department was able to celebrate a hundred years of formal forestry administration in the state with a net plantation area of nearly 80,000 ha feeding substantial and profitable State and private wood-processing industries, and providing a whole range of other forest benefits. In a ceremony to commemorate the occasion in Bundaleer Forest, the site of the first planting and forest office, the Governor, Sir Mark Oliphant (himself a South Australian), said: 'South Australia owes an enormous debt to her pioneers of forestry, to the enlightened legislation which established the forest service, and to the continuing fostering of tree planting by successive governments'. The state also owed an enormous debt, as N. B. Lewis has so fittingly described in his historical survey of the period,[73] to the great many dedicated 'forestry people' who, over this long time, had brought it all about.

CHAPTER 7

The Commonwealth

Early Views on the Role of the Commonwealth

After Federation, the State Governments continued to control the land within their boundaries. With this went the responsibility for the resources of the land, including its forest cover. Nevertheless, within a decade, the heads of the State forestry organisations were showing a strong national outlook on a number of matters and were being given political approval and encouragement to meet and discuss them. The first of what was to be a number of interstate forestry conferences was held in Sydney in 1911, attended by the heads of the forest services of New South Wales, Victoria, South Australia and Queensland and the Government Botanist of Tasmania. R. Dalrymple Hay (NSW), who organised and chaired the conference, saw forestry in Australia as 'a great national question'. The issues demanded:

> collective consideration in the interests of the whole Commonwealth ... [and though] the laws of individual States for administrative purposes must necessarily be shaped to comply with particular or local conditions ..., from the standpoint of national conservancy, they should provide for the maintenance of a sufficient proportion of forest wealth.[1]

All the resolutions of the conference — on professional education, afforestation of waste lands, the establishment of an Australian forestry league, the need for coniferous plantations, fire protection and legislation, and on the preservation of forest cover on catchments and the reservation of permanent forests on mountain ranges for hydrological purposes — though recognising the rights of the states and the need for separate action by them, strongly reflected a national outlook.

The second Interstate Forestry Conference in Melbourne in 1912 saw H. R. Mackay, who was Conservator of the Victorian Forests Department and president of the conference, paint a depressing picture of the states depleting their resources and of the neglect by State Governments of 'their plain duty ... [for] extensive planting, together with systematic improvement, replenishment, and maintenance of the natural hardwood forests'. He recommended that each

state reserve upwards of 10 per cent of its area and put it under management; but, as perhaps a better course, he suggested the Commonwealth take over or purchase sufficient area in each state:

> to establish a sound forest policy by putting the areas so acquired under efficient control and management, thus carrying out for the present generation and posterity the plain duty which most of the States have so badly neglected.[2]

The conference also recommended a program of action to establish uniformity in nomenclature of indigenous tree species.

The third Interstate Forestry Conference in Adelaide in 1916 took on an enhanced standing with representation by the appropriate Ministers of all the states, along with the heads of their forest services, and with the Governor-General, Sir Ronald Munro-Ferguson, as president. The practical interest of the Governor-General in forestry and his influence in political circles were to have far-reaching, beneficial effects on forestry in Australia. There was a strong Commonwealth outlook at this conference in the matters of professional education and technical training, the establishment of an Australian Journal of Forestry, the exchange of officers and technical information amongst states, and the need for the recently established Commonwealth Scientific Bureau to undertake research in forest products.[3]

At the fourth Interstate Conference in Perth, 1917, N. W. Jolly carried the concept of a national policy into the growing and supply of wood when he suggested that, as any alienation of state forests would affect Australia as a whole, it was 'a matter for consideration whether all proposed alienations should not be referred to the Federal Parliament before being allowed' (though his motive in this may well have been to hope for an external curb on his own political masters in Queensland, who were beyond his persuasion). He suggested that South Australia, which had a shortage of native forest, could concentrate on growing conifers if it could be assured that its hardwood requirements could be met by the other states at a cost lower than locally grown hardwoods and that the efforts of those States in the best position to produce pulp and paper might be concentrated on that task in the national interest. This conference marked the first attempt at production planning on a national basis. Jolly estimated that Australia would need '25 million acres producing 10,000 million s. ft. a year for an eventual population of 25 million people based on the present consumption of 2,000 million s. ft. of logs a year by 5 million people'.[4]

In 1919, C. E. Lane Poole commenced a role as protagonist for the involvement of the Federal Government in forestry that was to extend over more than thirty years. In a long article in 1919 titled 'A

forest policy for Australia',[5] three years after he had become head of the Western Australian service and before he had become closely involved with the Commonwealth Government, he painted a depressing picture of the long exploitation of the forests and 'sylvicultural work . . . so small as to excite laughter in other lands where forestry is an accepted national policy'. He saw the remedy in the adoption of a forest policy for the whole of Australia and nominated what he saw as the most important items for it, including land classification and forest reservation, the compilation and implementation of working plans by professional foresters, one professional forestry school, a training scheme for subordinate staff, research institutes for forestry and forest products, and an extensive publicity campaign.

In that year, the Commonwealth Government took the first steps towards an involvement with forestry by establishing a forest products laboratory in Perth and appointing I. A. Boas temporarily as its head. It also agreed to cooperate with the states in the establishment of a school for higher forestry education.

At the next (fifth) Interstate Forestry Conference in Hobart in 1920, E. H. F. Swain argued for a national estate of '37,500,000 acres to meet the future demand for wood assuming an annual per caput consumption of 3,000 s. ft. of logs' and an annual increment half that used by Jolly in his estimate for the previous conference.[6] Compromising with Jolly's estimate of 25 million acres, and one of 74 million acres made by D. E. Hutchins in his report,[7] he recommended a minimum of 30 million acres, weighting the allotment of this total to the states by a compounding of their respective areas, populations, existing reserves and estimated original forest areas. (The presently reserved areas of the states, fifty years later, are remarkably similar to the areas he derived in this way.) In the discussion which followed his paper on the subject, his colleagues were reluctant to depart from an estimated national need of 24,500,000 acres, which the states had brought to the attention of the Premiers after the previous conference. Swain moved that the conference endorse this figure and that the next Premiers' Conference be urged to consider it. A month later a State Premiers' Conference 'endorsed the desirability of aiming at the reservation of this area'. The question of Commonwealth finance was also raised at the fifth conference, which resolved 'to urge upon the Commonwealth Government the advisability of subsidising the forestry operations of the States, and of guaranteeing, in addition, adequate loan funds for the purpose'.

The need for softwood plantations was always prominent in the thoughts of the heads of the services and at the sixth Interstate Conference in Brisbane, 1922 (called the 'Australian Forestry Conference'), they resolved that every effort should be made towards afforestation of the extensive tracts of available and suitable waste lands (i.e. vacant crown land) in the states so that the nation might

become self-supporting as rapidly as possible.[8] At the next (seventh) conference in Sydney, 1924 (called the 'Australasian Forestry Conference' in deference to the presence of a delegate from New Zealand), and the last to be held for 25 years, L. G. Irby (Tasmania) thought that the scale of afforestation should be increased and suggested a scheme of State–Commonwealth cooperation whereby the State Governments would lease suitable areas to the Commonwealth Government and supervise the necessary operations; the Commonwealth would provide the finance; the States and Commonwealth would jointly approve the areas, species and operations and would split the net proceeds equally; and the plantations would stand as offsets to Commonwealth and State national debts, the revenue forming sinking funds for their reduction.[9] The conference decided this was a question for any State Government to take up with the Commonwealth Government if and when it wished. Irby had already reported at the previous conference on attempts to establish a scheme of 'plantation homes or colleges' where waif children from England could be housed and educated while they established plantations, England providing the finance. 'Let the waste children of the Empire reclaim the waste lands of the Empire and in reclaiming those lands arrive at their own reclamation,' he said (to the applause of the conference). At this conference, too, there was cooperative response to an appeal from the Commonwealth Statistician for help in framing questions to the State Governments which would provide more detailed and uniform statistics on forestry and forest industry.

The Commonwealth's Role Begins

In 1924, the Commonwealth Government took a positive step towards involvement in forestry by the appointment of Lane Poole as its Forestry Adviser. After his resignation from the Western Australian service in 1921, he had been commissioned by the Commonwealth in 1922 to report on the forest resources of Papua, this commission being extended to the Mandated Territory of New Guinea in 1923. His first jobs as Adviser were to extend his reconnaissance of the land under Commonwealth control to include Norfolk Island, to report on the forest situation in Australia and to propose a federal forest policy. In this proposal he saw the Commonwealth Government having particular responsibility to ensure appropriate continuous finance for continuity of policy, to provide a single first-class school to educate professional foresters, to provide funds and staff for a federal forest products laboratory, to ensure the role of forests for protection, water and aesthetics, and to carry out various resolutions for action of a national kind passed at the various interstate forestry conferences.[10]

The New South Wales Commissioner took strong exception to remarks Lane Poole made about a lack of trained men in that state and the inadequacy of the *Australian Forestry Journal*, for which the

Commission had accepted responsibility in an attempt at national communication. While agreeing on the need for coordination in principle, the Commissioner was reluctant to join any movement towards it in the present atmosphere.[11] Professor H. H. Corbin, erstwhile head of the Adelaide University School of Forestry and Professor of Forestry at Auckland University at the time, also took exception to Lane Poole's remarks about the lack of 'fully-trained' foresters in Australia and the deficiencies of Adelaide as a centre for professional education. He saw in the time to come a need for more scientific training, but:

> what is wanted now is a special service to be held in all the respective States of the Commonwealth to pray for harmony among foresters, and the elimination of clashes on account of personal interests from amongst them, with a special prayer for the forests of Australia until that harmonious working is brought about.[12]

If the prayers were offered, later personal clashes, particularly over the matter of professional education, suggest they were not particularly successful.

In 1925, the Commonwealth Government, having been guaranteed the cooperation of the State Governments in providing the necessary students, offered to establish an Australian Forestry School in Canberra and, pending the erection of a building for it, accepted the offer of the University of Adelaide for the courses to be conducted there. At the end of the year, Prime Minister Bruce announced in an election policy speech that, having established the forestry school, the government also proposed to establish a Forestry Bureau 'to advise and assist the State Governments in all matters relating to the development and utilisation of our timber resources'.[13] He was also prompted by a paper by V. A. Grenning of the Queensland Forest Service on 'The softwood problem in Queensland' to say:

> the warnings of this bulletin show clearly that it is only by a well-directed and co-ordinated scheme that the timber famine that confronts us can be arrested. The Federal Ministry is prepared at all times to cooperate with the States in matters that concern the whole Commonwealth and it views the present forestry situation as one of the most important of the national problems to be solved. The Ministry proposes by the establishment of the Commonwealth School of Forestry to provide the means for training the necessary personnel to carry out this great task. It must look to the States to do their part, as they have control of the lands upon which plantations can be put down.[14]

In the same year, the Federal Capital Commission commenced a forestry program in the Federal Capital Territory, with G. J. Rodger as head of a new branch.

The Forestry Section of the Australian Association for the Advancement of Science took the opportunity at the Association's congress held in Perth in August 1926 to promote the resolution:

> In the opinion of Council, there is need in every State of Australia, for more systematic investigation of those forestry problems which come under the head of sylviculture and forest management. A central coordinating authority is necessary if this work is to be carried out satisfactorily. The Committee suggests that the Commonwealth Government, having established an Australian Forestry School, might with advantage extend the scope of the work by embracing general research into the forestry problems.[15]

The Royal Commission on the Constitution, 1927

In August 1927, a Royal Commission was appointed:

> to inquire into and report upon the powers of the Commonwealth under the Constitution and the working of the Constitution since Federation; to recommend constitutional changes considered to be desirable and to examine and report upon [a number of] subjects from a constitutional point of view.[16]

Although forestry was not one of those specified subjects, the commissioners received and considered evidence on it, on the grounds that the directions of the government to them were expressed in terms sufficiently wide and general as to permit them to do so. Counsel assisting the commission suggested in his opening address that, in the years which had elapsed since the Constitution was produced, 'opinion may develop in such a way that legislation may be deemed necessary on subjects which, when the Constitution was drafted, were not thought subjects for legislation';[17] for example, he had it from 'most distinguished experts that the timber resources of Australia will never be developed to the best advantage until they are under national control'.[18]

One of the 'distinguished experts' who held this view quite strongly was Lane Poole, by then Commonwealth Inspector-General of Forests, with his depressing experience of forestry politics in Western Australia still fresh in his mind. He was the first to present a statement on forestry,[19] and his submission was used as background by the commissioners in their questions to other people giving evidence. He pointed to the unsatisfactory position of forestry in Australia: the total area of land capable of intensive forestry was estimated by foresters to be 24,500,000 acres; the area permanently reserved for forestry was less than half of this, and a lot of that was unsuitable and insufficient for the present demand; and there was also a deficiency in softwoods, which was being made up by imports. He drew a picture of past misuse of forests: had forestry not been in

the hands of Lands Departments when the Constitution was framed, and had there been technical foresters to give appropriate advice, 'the new central government would have been given power to prevent some of the disasters that all the States now lament' — power to reserve as national forest an adequate area of the best of the timber lands and power to reserve forests for the protection of the main catchment areas of the major waterways and protection of agricultural land on the borders of arid regions against wind erosion. Lane Poole had doubts about loans by the Commonwealth Government to the States: either the Federal Government should take over the land itself as the only real security for a loan, or it should obtain a guarantee from a State Government that the work for which the loan was obtained would be continued until the end of the rotation. He considered forestry 'should be a Commonwealth function because the States had shown themselves incapable of taking the long views that are necessary to assure a continuity of forest policy throughout the life of a forest'. He was very critical of the State Governments, and he was for full, exclusive control by the Federal Government.

As might be expected, Lane Poole got no support for this extreme view from any of the State forestry heads. Some saw merit in limited Federal control; most rejected any form of control; but none insisted on a go-it-alone policy. They all supported cooperation and coordination in some form or other. Dalrymple Hay, as former Commissioner of New South Wales, suggested that there was strong argument for Federal finance for State activities with supervision of such activities by a non-political, coordinating and supervisory body of forestry experts. He argued strongly for each State doing what it could do best (e.g., Victoria and Tasmania growing the softwood supply for the whole of Australia). Throughout his evidence he strongly pressed the desirablility of a coordinated effort.[20] Kessell (as Conservator of Western Australia) thought the handing over of control of forestry lands by the State Governments to the Commonwealth was not feasible and, in the case of Western Australia, was quite undesirable. Nevertheless, there were many ways in which the Commonwealth Government could and should help the States, such as in the provision of education facilities for higher training, the collection and distribution of information and in research problems of a fundamental nature in forestry and forest products. He pointed to the Commonwealth Government's import duty on timber as a source of funds for this assistance, a proposal he was to put on several later occasions when sources of financial aid to the States were discussed.[21]

Given his background, the views of Mackay, lately a Commissioner and previously Conservator of Forests in Victoria, were of particular interest.[22] At the time of the conventions on Federation, he was an officer of the Victorian Parliament and, as such, backed by a study of forestry which he had hoped would take him into the forestry section

of the Indian Civil Service, had been appointed Secretary to the Royal Commission set up by the Victorian Government in 1897 to report on forestry in that state and was largely responsible for the fourteen voluminous reports the commission produced between 1898 and 1901. It was natural that, with Federation looming, the Royal Commissioners, and no doubt other interested parties, should consider the possible role of the new Federal authority, and they did so, by his account, privately.

> There was a balanced opinion amongst some of the leaders but, as a whole, they took the view that it would be unwise to seek or press for the surrender of any large area of forests or crown lands, so that apart from small areas of land and buildings they left the question undisturbed.

He thought it undesirable that the Commonwealth should take over the forests, being as they were a great property of the State Governments: they should be a permanent source of State revenue. But every endeavour should be made to secure a better feeling amongst the States in the use of crown lands and forests and to secure something closer to a unified policy. If the Commonwealth were to assume full powers, a stable and efficient management and control of the forests would be of great advantage from many aspects, but if the State Governments would realise the importance of forests, employ efficient staff and support them, then better results would flow from State control. He would support giving the Commonwealth reasonable, limited powers and the creation of a Council of Control, Supervision and Advice with the consent of the State Governments. Alternatively, the Commonwealth could take over by negotiation and with compensation a reasonable quantity of land in each state and put it under a high standard of management. Apart from this, he favoured power to cooperate.

Irby, Conservator of Tasmania, rejected Federal Government control: the poor performance of the past on the part of the States would not have been avoided by it, because the problem had been a complete lack of interest on the part of the public. But he was strongly for Commonwealth–State collaboration, particularly in the matter of finance and drew the attention of the commission to his proposal to the seventh Interstate Forestry Conference of a Commonwealth–State Government cooperative afforestation scheme which had prompted the interest of the Development and Migration Commission in the matter and the appointment of G. J. Rodger by the Commonwealth Government to report on its feasibility and desirability. The State Government had approved in principle his scheme for planting the waste lands by waif children from England and had sent it to the Commonwealth Government for forwarding to the Imperial Government.[23]

Jolly, Commissioner for New South Wales, saw any dual control by Commonwealth and State as hopeless: the Commonwealth should have the whole power or none. He was in favour of cooperation and coordination (as his contributions to the various interstate forestry conferences attested).[24] By the time Jolly had given his evidence, the commission was finding it difficult to reconcile the estimates of the forest resources provided by the various authorities. It drew attention to this in its report with the gentle remonstrance that 'it appeared to the Commission that the total and specified areas may have been based to some extent on mistaken estimates'.[25]

Swain, Chairman of the Provisional Forestry Board, Queensland, had already published some thoughts on the matter in a paper 'Federal or State forestry — which?'. As he outlined to the commission,[26] in it he had expressed the view that, whereas Federal forestry was inevitable in some other countries of the world such as the USA, India and South Africa, in Australia, on the other hand, 'State boundaries, State rights, interstate jealousies and State land ownership furnish formidable bars to the federalisation of forestry'. There were other obstacles, too, and for the present any transfer of power was 'not within the realm of practical politics'. Nevertheless, inestimable service to forestry would be provided by Commonwealth legislation which (i) created a Federal forestry fund from the proceeds of tariffs and provided for loans to the States for forestry purposes; (ii) converted the Interstate Forestry Conference into a Commonwealth Advisory Board of Forestry; and (iii) set up a Forestry Secretariat which would control the Federal forestry fund he envisaged and disbursements from it, would control a Federal forest products laboratory, a school of forestry and a forest research institute, would service the advisory board, and would inquire into and receive information on forest conditions of the states. Since then, a number of these proposals had in fact been implemented. Swain was also at pains to see that a number of the statements Lane Poole had made in his submission, both general and specific to Queensland, should not go unchallenged. (To commissioners earnestly trying to get a clear picture of forestry in Australia and to make appropriate recommendations for a Federal role for it, the personal clashes and contradictions must have been both puzzling and unhelpful.)

In their report, the commissioners summarised the present relationship of the Commonwealth and the States. They saw the evidence of Lane Poole, Hay and Mackay as being 'in favour of a greater, or an exclusive, control of forests being transferred to the Commonwealth', and that of Kessell and Swain as 'evidence to the contrary'. They commented: 'It appeared to the Commission that although forestry had been neglected in certain of the States for a time, great progress had been made in almost all the States in recent years'.[27] On the main point of the inquiry the commissioners were divided. Four of the seven

recommended in favour of a 'Federal system of government [as] . . . best suited to the needs of the people of Australia at the present time'.

> A central authority is necessary for the discharge of those functions on which Australia should speak and act as a whole e.g. defence and relations with other countries, and is desirable for the exercise of powers of legislation and administration with respect to matters e.g. weights and measures and coinage, in which uniformity is convenient. But in our opinion the existence of self-governing units within the area of the Commonwealth is also necessary.

They offered no views on forestry. The other three commissioners were of the opinion that:

> the most suitable form of government for Australia is one that provides for all major national questions being dealt with by the central Parliament and that leaves matters of minor importance, as well as the administration of federal laws to a considerable extent, to local bodies (States or provinces)'

and they recommended machinery by which the wider powers could be taken up by the Federal Government. But, if this recommendation were not accepted, then they recommended the Constitution be amended to give full power to the Commonwealth Parliament over the specific matters to which the inquiry had been directed and also over 'Health, industrial matters, trade and commerce, railways, aborigines, fauna and flora, fisheries and forestry'. With regard to the last of these they said:

> Fisheries and forestry are capable of great development and in order that the Commonwealth may assist in this development it is necessary that the Commonwealth Parliament have the power to do so . . . There is also an aspect of forestry that requires consideration from a national authority, that is, the protection of the forest cover of water catchment of rivers that supply more than one State with water. The timber thereon may have no commercial value, but by neglect may become depleted through fire or other causes, and thus affect the supply of water to a State having no control over the catchment area.[28]

The Forestry Bureau

As part of his recommendations to the Federal Government on forest policy in 1924, Lane Poole 'drew up a plan of organisation for a Federal Forestry Bureau'.[29] It was to have five branches: one to deal with forestry matters in the territories of the Commonwealth; one to provide a financial link between the Commonwealth and State Governments; an educational centre to turn out professional foresters; and a research centre to investigate silvicultural and management problems. It was also to have a forest products laboratory, a

matter dear to Lane Poole's heart and one in which he had already been instrumental in getting the Commonwealth Government involved, through its Advisory Council of Science and Industry, in Western Australia. A plan for extended forests products investigation by the Institute of Science and Industry, which was created in 1920, had not come to fruition because of lack of finance and, with his move to Canberra in 1924, Lane Poole was now pressing for forest products investigations to be centred there.

With the announcement at the end of 1925 of its intention to establish such a bureau, the government asked Lane Poole in 1926 to draft an appropriate Bill and, in anticipation of the legislation, approved the creation and filling of positions of an Inspector-General, a Secretary, a typist and two lecturers for the Australian Forestry School (which by this time had started to function temporarily at Adelaide University). Lane Poole was appointed Inspector-General. In 1927, the Australian Forestry School transferred its functions to new buildings at Canberra. Jolly had relinquished headship of the school at Adelaide University to become Chief Commissioner in New South Wales and, no suitable person being available to replace him or the government being unwilling to make an appointment, Lane Poole (who on his own protestation was not a teacher and found teaching distasteful)[30] assumed the joint roles of Inspector-General in charge of the proposed Bureau and Principal of the school, positions he was to continue in until the end of 1944.

From the time of his first proposal, Lane Poole saw the school as a branch of the Bureau. He continued to stress this concept as the school developed, however slowly, and the proposal for the Bureau marked time. 'The part,' he said in 1930, 'has to date been greater than the whole.'[31] For several reasons, the part was to be greater than the whole for many years. The main one was the slow passage of the legislation to formally establish the Bureau.

Leave for the introduction of the Bill which Lane Poole had drafted in 1926 was first given on 20 September 1927. Speaking at the second reading on 3 November, Sir William Glasgow, who introduced it, said that he 'felt sure that everyone would agree that a measure which has for its object the launching of a national forest policy is long overdue'. He painted a picture of wasted native resources and the need for softwoods as shown by the size of the import bill. As the Forestry School had been established, the other thing the Commonwealth could do was to organise and coordinate research work into various problems of silviculture and management (hence the need for the Forestry Bureau, as foreshadowed in the Prime Minister's policy speech of the previous year). Though the Bureau was in fact already established, he thought that the founding of a national policy was so important that it should receive the assent of Parliament. There was considerable debate but no major dissension; some amendments were

proposed but readily agreed; the Government and Opposition seemed united in their goodwill toward a national policy and the involvement of the Commonwealth through the proposed Bureau. By the end of November it was being debated in the House of Representatives, but pressure of business prevented its further progress there and it was 29 February 1929 before it was reintroduced. It was still regarded highly and it had been endorsed by the Empire Forestry Conference of 1928. Although a few amendments were proposed, they were readily dealt with. By 22 March it was being read for the second time, when the Bruce Government fell. It was May 1930 before the Scullin Government resurrected it, and it was finally assented to in late July 1930, nearly three years after it had first been proposed. The powers and functions were essentially as Lane Poole had first proposed them:

(a) advising the Adminstrators of the Territories on all matters pertaining to the management of forests
(b) the management of forests placed under its control by the Governor-General
(c) the establishment of experimental stations for the study of silviculture, forest management and forest protection
(d) the provision of educational facilities for the training of professional foresters
(e) the establishment and awarding of forestry scholarships
(f) the collection and distribution of forestry information
(g) the publication of reports and bulletins dealing with forestry and
(h) such other functions as are prescribed.[32]

There were a number of clauses covering the establishment and administration of a 'Forestry Fund', which had not been proposed initially and which mainly related to donations made by the Empire Forestry Conference for a Schlich Memorial Medal, by Russell Grimwade for a scholarship through an endowment, and by the Sydney and Suburban Timber Merchants Association towards a library.

Although it was clear from the tenor of the debates that both the Government and the Opposition favoured the bill, the Department of Home Affairs as the responsible Department was not particularly energetic in sponsoring the practical expression of this interest without legislative backing, and most of the funds for the Bureau's activities, while it awaited formal standing, came from the Development and Migration Commission, which sponsored several investigations. This lack of interest on the part of the parental Department was conveniently mirrored by the Public Service Board and Treasury, which used the delay in legislation as an excuse for inadequate funding and lack of appointments.[33] By the time the Act was assented to in 1930, the effects of the general economic depression were such that not only was no development possible, but the main problem was one of survival, and closure of what there was of the Bureau seemed

likely. The role of the Bureau as Lane Poole had seen it had been reduced by the firm decision of the government in 1928 to establish a forest products laboratory within the CSIR instead of in the Bureau.

Although a forestry program was being pursued with vigour in the Federal Capital Territory, there had been little response from Papua, New Guinea and Norfolk Island and little was known of the resources or potential of North and Central Australia, the 'Territories' of clause 4(a) of the Act. Little was being done of an experimental nature. There was a lack of suitable applicants for research positions even if funds had been available, though this situation had in fact been anticipated by the inclusion of clause 4(e) in the Act, and B. U. Byles, M. R. Jacobs and A. D. Lindsay had been selected for overseas scholarships in 1928–29 as future research officers of the Bureau. The Public Service Board saw all this as an under-utilisation of the facilities of the Bureau and recommended an interstate conference, including three non-foresters as members, to discuss the future of the Bureau. Pending that conference (which never eventuated because the government went to the polls before invitations could be issued), the government agreed to retain the services of Byles and Lindsay, who had returned from overseas, and to continue the allowance of Jacobs, who was still in Europe.

The Bureau survived — but only just. For years Lane Poole was to report the arrested development of the Bureau owing to financial troubles. In its early years, much of the research, other than that of Lane Poole, was done by the staff of the school. The government was unable to offer permanent appointments to its three scholarship holders until 1933, when Jacobs was appointed a research officer in the Bureau and carried out an investigation of the timber supplies and the eucalypts of the Northern Territory. By the late 1930s, the struggling organisation had gained some strength. Earlier recommendations for a planting program in the Federal Capital Territory had resulted in 4000 ha of coniferous plantation as early as 1936. Although nothing had eventuated in Papua or the Northern Territory, an Assistant Forester had been trained in Canberra and a forest policy had been initiated for Norfolk Island; and a qualified forester (J. B. McAdam) had been appointed to the Mandated Territory of New Guinea in 1937. In Canberra, a vigorous program of research into eucalypts and pines over a range of disciplines was being carried out by the small research staff of the Bureau and the lecturing staff of the school. This included a comprehensive series of meteorological observations related to silviculture. In 1938 a major move in cooperative work with the states was made with the establishment of a research station at Mount Burr in South Australia, in collaboration with the Woods and Forests Department, with J. M. Fielding in charge.[34] As with so many other forestry organisations in Australia, the Bureau's steps were just getting firm when World War II commenced and a

reduction in staff and funds considerably restricted both maintenance of the present research program and the initiation of projects for the future. The second cooperative experimental field station was established at Hobart in January 1941 under A. D. Helms.[35] Jacobs, who had returned to the Bureau in November 1944 after war service, was appointed Principal of the Forestry School in January 1945. Lane Poole retired in February 1945. He had been major protagonist and exponent of Commonwealth forestry for over twenty-five years; and whatever it was, it was largely his influence and his doing. From his retirement until the end of March 1946, the Bureau was administered as a holding operation by the secretary of the Bureau, R. G. Kappler, under the Department of the Interior.[36]

The Forestry and Timber Bureau and the Forest Research Institute

The end of the war in 1945 and Lane Poole's retirement prompted a review of the Bureau's powers and functions. The value of the information-gathering and planning functions of Commonwealth Timber Control during the war had convinced the government that they should be continued in peace time and the Bureau provided an obvious organisation into which they could be incorporated. Formal direction of this was provided by the Forestry and Timber Bureau Act 1946, which amended the Forestry Bureau Act 1930–44 by altering the title of the organisation from Forestry Bureau to Forestry and Timber Bureau, placing the administration of the reconstituted Bureau under a Director-General instead of an Inspector-General of Forests, and extending the powers and functions of the Bureau to include:

> (a) collecting statistics and information regarding timber supplies and requirements in Australia and formulating programmes in respect of supply, production and distribution of timber in Australia, and the importation into and exportation from Australia of timber
>
> (b) advising the Government of the Commonwealth or any instrumentality of that Government, or, when so requested, the Government of any State or any instrumentality of the Government of any State, or any body or person, on matters relating to the supply, production and distribution of timber in Australia, and the importation into, and exportation from, Australia of timber
>
> (c) carrying out investigations and research relating to the supply, production, distribution and use of timber'.[37]

The intention of the new functions of the Bureau was clear from these clauses; that is, to get information about and to plan the production, imports and consumption of timber on a national basis as an arm of Commonwealth Government working in cooperation with the states; to give information and assistance to the states or anyone

else when asked; and to conduct research into these matters. To fulfil them, new Divisions of Forest Resources and of Timber Statistics and Programming were added to the existing sections of the Bureau, which were now formalised as the Divisions of Education (the Australian Forestry School), of Forest Research and of Administration. The Bill was assented to on 15 August 1946 to take effect from 12 September 1946. Anticipating the Act, G. J. Rodger, previously Conservator of the South Australian Woods and Forests Department, was appointed Director-General on 1 April 1946, and on 1 May he took over the administration of Commonwealth Timber Control, which was transferred from the Department of Works and Housing to the Department of Interior on 1 July and merged with the new Division of Timber Statistics and Programming. Rodger acted as Commonwealth Controller of Timber from May to December 1946 when the National Security (Timber Control) Regulations, under which the Control operated, lapsed. H. R. Gray, previously on the lecturing staff of the school, was appointed in July 1946 to head the Division of Statistics and Programming which, along with the Director-General and Administration, was accommodated in Melbourne. D. A. N. Cromer, from the New South Wales Forestry Commission, was appointed in November 1946 to head the Resources Division, which was established in Canberra.

For the next decade, the several Divisions of the Bureau expanded their scope and responsibilities as far as funds allowed. The field research station in Tasmania, closed during the war, was reopened; a new one was established in Western Australia; a forestry officer was appointed to the Northern Territory; and programs were set up for research into the genetics and nutrition of radiata pine and for gathering more reliable estimates of the forest resources of the nation than were presently available. But, towards the end of the 1950s, there was increasing concern in a number of circles for the future of both forestry education and forestry research in Australia. While the arrangements under which the Australian Forestry School had functioned for thirty years as a government organisation with loose ties to state universities and forest services had been very successful and had had some advantages at undergraduate level, these arrangements were not adequate for post-graduate training, and there was an evident need for this. There was also a body of opinion that forestry research at the Commonwealth level lacked opportunity and backing because it was a division of a bureau of a Public Service Department and spirited discussion at the second Institute of Foresters Conference in Canberra in 1958 was prompted by a statement to this effect in a paper[38] which compared the rate of development and the success of forestry research under the Forestry and Timber Bureau with that of forest products research under CSIRO. It posed the question whether, in view of the far greater likelihood of success which forestry

research was likely to enjoy within CSIRO, there was any real reason to keep it outside that organisation.

Representations to government were such that in February 1959 the Cabinet appointed an inter-departmental committee of representatives of interested Commonwealth Government Departments and CSIRO to look at forestry education, particularly the possible relationship between the Forestry School and Canberra University College, which had recently established a Faculty of Science with five new science departments, and at forestry research, particularly the relationship between the research at the Bureau and forest products research at CSIRO. After extended deliberation on the part of this committee, the Minister for the Interior made an announcement in April 1961 (by which time the Canberra University College had been incorporated in the Australian National University) that:

> The Government has decided to establish a Forest Research Institute to strengthen and extend the work of the research stations of the Forestry and Timber Bureau. The Institute will function as a Division of the Bureau in a close association with the Australian Forestry School and appropriate Divisions of CSIRO ... Conferences will be invited between the Australian National University and appropriate authorities to see if a mutually satisfactory association of the Forestry School with the University could be developed, which would retain the present collaboration between the institutions which support the School and on which its students must depend for later employment ... An Australian Forestry Council will be created under the Forestry and Timber Bureau Act to serve as a National Advisory body on forestry matters ... The Government has received strong representations from the timber industry to strengthen the Bureau so that the effectiveness of its work can be increased. Measures which might properly come within the functions of the Bureau and which might assist the development of the timber industry are being considered.[39]

In 1963, the Forest Research Institute was formed by amalgamating the Silvicultural Research Division and the Forest Resources Division (which had become the Management Research Division in 1956) of the Bureau, and plans were drawn up for a new building at Yarralumla, into which the Institute eventually moved in 1967.

In February 1970, M. R. Jacobs retired as Director-General, having followed G. J. Rodger in December 1959.[40] He was succeeded by D. A. N. Cromer, with A. G. McArthur taking over Cromer's place as Director of the Forest Research Institute.

With a change in government in late 1972, the Forestry and Timber Bureau was transferred from the Department of National Development, which had administered it since 1963, to the Department of Primary Industry, which immediately instituted a review of the functions and role of the Bureau, the appropriateness of the 1946

Forestry and Timber Bureau Act for conditions nearly thirty years later, the scope and effectiveness of the research activities of the Bureau, and the functional arrangements relating to matters of forestry and forest products within the Commonwealth Government. Following consideration of this review within various Commonwealth circles and extensive discussion of it with the State forest services through the Australian Forestry Council and with wood based industries, the Commonwealth Government announced on 26 March 1975 that:

> agreement had been reached for the establishment of a Division of Forest Research within the CSIRO ... [to] include the research activities at present carried out by the Forest Research Institute and the harvesting and mensuration research groups of the Forestry and Timber Bureau ... [Its] role would be to concentrate on long term strategic research to complement the forestry research undertaken by the State forestry authorities.[41]

The new CSIRO Division of Forest Research came into operation, with headquarters at Canberra, on 1 July 1975. It was ironic that the CSIRO Division of Forest Products, with which the Forestry and Timber Bureau research organisation had been compared invidiously twenty years earlier, had by that time been dismembered and its identity lost.

At the same time, the government advised that:

> an inter-departmental committee would be established to make recommendations as to Australian Government administrative arrangements for policy formulation for forestry and forest products. In the meantime the remaining staff of the Forestry and Timber Bureau working on policy matters will remain with the Australian Department of Agriculture.

This focused attention on the wide spread of Commonwealth departmental interest and responsibilities that must inevitably arise from the wide range of activities involved in growing, transporting, processing, manufacturing, importing and exporting wood and that could well lead to overlap, duplication, conflict and confusion. In October 1976, the government announced that the Department of Primary Industry would be responsible for 'forestry matters up to the stage when the product of the forest is delivered to the mill door', and that the Department of Industry and Commerce would be responsible for 'matters affecting the forest products industry i.e. from the mill door onwards', except that the Department of Primary Industry would be responsible for the 'export woodchip industry, wood sleepers and timber in the round, Australia Forestry Council, economic research relating to forestry and forest harvesting'.[42]

Professional Education

Early Discussions and the School of Forestry, University of Adelaide

Among the many issues which R. D. Hay, the chairman of the first Interstate Conference (Sydney, November 1911), saw as demanding 'collective consideration in the interests of the whole Commonwealth' by delegates to the conference was 'the education and training of forest officers'. The delegates responded enthusiastically with information, discussion and resolutions.[43] H. R. Mackay (the Victorian Commissioner) reported in some detail on the recent establishment of a forestry school at Creswick. W. Gill (South Australian Conservator), outlined the Department's probationer training scheme in association with the University of Adelaide 'for people over 18 and of sound constitution' who wished to enter the forest service, preference being given to those who had passed the Senior Public Examination of the University. It was a course of three years, two at the university and a third year of practical work on the state reserves. Mackay asked if it 'was desirable to keep in view the question of linking forest teaching with the University . . . by the establishment of a Chair of Forestry at one of the Universities'. L. Rodway (the Tasmanian Government Botanist) thought it was not, because:

> the student who takes up forestry under those conditions is compelled to attain a very high standard of education in order to matriculate and you exclude a great number of young men who will make the very best foresters because very often a man who is essentially suitable for forestry work is notoriously bad at languages.

He noted that there was then no system of educating and training foresters in Tasmania. Hay pointed out that there was no course of training for forest officers in New South Wales but that there was a system of examining candidates who wanted to enter the forestry service. A direction had been given in the Forestry Act (of 1909) that regulations should be framed 'to provide for the organisation of a system of education in scientific forestry', and a committee selected by the Public Service Board had recommended the appointment of a lecturer at Sydney University and a program of university work following a practical course. It was strongly argued by N. W. Jolly, recently appointed Director of Forests in Queensland, that a high standard of training was essential and that the interests of the states would be most economically and efficiently served by the foundation of one central school for the whole of Australia in close proximity to a natural forest. In his opinion, this would preclude it from being established within a university or any other educational establishment in any of the cities.

The conference resolved:

(i) that a high standard of education and training is essential for the successful pursuit of forestry;
(ii) that in view of the necessity of securing practical knowledge and experience in the work of tree nurseries, plantations and natural forests, it is essential that a course of theoretical and practical training of a high standard should be established;
(iii) that a Forest School on the above lines be founded, the course of training in which will be so thorough and practical that its diplomas and certificates will be accepted and recognised throughout Australia.

Jolly's argument for locating the school close to a natural forest, thus precluding it from a city university, was interesting in that he had been appointed Instructor of Forestry for the South Australian Woods and Forests Department in October 1910 to inaugurate the Department's probationer training scheme to which Gill referred. The first of the state's Rhodes Scholars in 1904, he had read forestry at Oxford under Sir William Schlich [44] and had then gained experience with the forest service in Burma. He resigned in August 1911 to become Director of Forests in Queensland. His place as instructor was taken by H. H. Corbin, who took up his appointment in October 1911,[45] becoming lecturer in forestry at Adelaide University in 1912 and Consulting Forester to the South Australian Government in 1916. Corbin had an impressive academic background and had had considerable field experience in Europe and India.[46]Between 1911 and 1926, the Adelaide school graduated twenty-five foresters, most of whom eventually occupied senior positions in public and private forestry in Australia. Many of the early graduates served in World War I, one of them (R. G. McKail) being killed.

Despite the initiative of the South Australian Department and the University of Adelaide in providing the tertiary course, despite the fact that the school was functioning as a national institution (students were accepted from all states and were eligible to enter any service), and despite the support of the Vice-Chancellors of the other universities for the scheme, the other state forest services lacked enthusiasm for it, and discussions for an alternative continued at successive Interstate Conferences. Although several of the service heads did not possess formal qualifications themselves, there was no disagreement that the training of the Australian professional forester should follow the northern hemisphere example and be carried out in a university. There was general agreement that the comparatively small demands for staff made a national school rather than separate state schools the most sensible arrangement, that for instruction purposes it should have reasonable access to a range of well-managed forest types, and that a location close to a forest research organisation

was desirable. Unfortunately, a centre with these attributes did not exist, and the search for an acceptable compromise was to last for fourteen years — time for considerable changes in the people involved, their outlooks and their alliances.

At the third Interstate Forestry Conference (Adelaide, May 1916), a lengthy resolution was passed which included reference to the need for a 'sound system of training for all persons employed in the Forest Service' and for a 'complete course of advanced training at a university within the Commonwealth' for candidates for the higher positions of the forest services. The resolution also affirmed the 'desirableness of encouraging higher officers to study forest management and practice in Europe, America or British India'.[47] At the fourth Interstate Forestry Conference in Perth in November 1917, Jolly (as Director of Forestry, Queensland) stressed the need for a source of well-trained forest officers, the intimate connection of forestry education and research, the need for a central research organisation, and the need for one well-equipped, central educational institution near the forest. Lane Poole (as Conservator of Forests, Western Australia) endorsed Jolly's concept of one school for the nation, located in a forest. He suggested it be located in New South Wales, since that state furnished the widest variety of forestry conditions. The conference subsequently resolved that 'the Commonwealth establish an institution for education in forestry and forestry research work'.[48]

However, as Lane Poole pointed out at the fifth Interstate Conference (Hobart, April 1920), nothing was done to implement the resolution, either in the way of education or research. He pointed to inadequacies of the course at Adelaide University and to the lack of indigenous forests there for practical training. He outlined proposals for a single school in New South Wales, a curriculum, timetable and fees. Corbin argued for retaining the Adelaide scheme, supported by appropriate State Government financial assistance — something which his own State Government, however, was unwilling to provide.[49] After much discussion it was resolved:

> That this Conference emphasises the urgent need for the establishment of an Australian Forestry School for the training of higher-grade foresters. That a delegation should wait upon the forthcoming Premiers' Conference ... with a view to submitting a scheme for the establishment of an Australian School of Forestry
> 1. That there shall be established an Australian School of Forestry for the training of officers in the profession of forestry
> 2. That the Australian School of Forestry be established in New South Wales
> 3. That such school shall provide for the issue of a diploma, and the qualification for entrance shall be a two years' science course in an Australian university or its equivalent, as laid down by the govern-

ing body; except in the case of any Australian forest officer or employee selected by the forest authority of a State for a course of training owing to special ability and qualifications
4. That the cost of establishment and maintenance be met by contributions from the States on a population basis, and a subsidy from the Commonwealth on the basis of one-sixth of the gross total contributions by the States
5. That the cost of providing for a teaching staff, to include an experienced prinicipal and associate lecturers, should not be more than £6000 per annum, and the cost of the establishment should not exceed £12,000
6. That no charge should be made for training and instruction at the school
7. That the control of the school should be vested in a council constituted by the appointment of an equal number of representatives of each State and the Commonwealth.[50]

As a result of the submission to the conference of Premiers and state Ministers in May 1920, that conference resolved:

1. That there shall be established an Australian School of Forestry for the training of officers in the profession of Forestry, and that this school be established in New South Wales
2. That the control of the school be vested in a Council constituted by the appointment of an equal number of representatives of each State and the Commonwealth; provided that the cost of the establishment be met by contributions from the States on a population basis and a subsidy from the Commonwealth on the basis of one-sixth of the gross total contribution from the State and
   That in view of the fact that the success of the school will depend upon a guarantee by each contributing State of a fixed minimum number of nominated students bi-annually, the Government of each State be urged to furnish such guarantee before the end of March, 1921.[51]

The Council of Control, consisting of representatives of each of the states (excepting Tasmania) and the Commonwealth, was subsequently appointed and met in Sydney in January 1921. At these meetings, resolutions were passed dealing with the qualifications and terms of appointment of a principal; the constitution of the school staff; the qualifications of students for entrance; the powers to be exercised by the Council and the necessary details connected with the conduct of the school. As well as meeting in Sydney, the Council members visited the proposed site of the school at Laurel Hill in Bago State Forest, New South Wales. Each of the states furnished the required guarantee of students, excepting South Australia and Victoria. The former stated that it was not possible for the government to guarantee a definite number of students, while the latter intimated

that, on account of the general financial stringency, the government had decided to remit the matter for consideration at the next Premiers' Conference.

At the sixth Interstate Forestry Conference in Brisbane, 1922, Swain (Queensland) expressed concern that a school in New South Wales would not serve Queensland's requirements because of the state's 'silvic isolation'. He argued for linking an education establishment with a research organisation separately for each state. Owen Jones (Victoria) argued just as strongly, as did Kessell (Western Australia) and Hay (New South Wales) for a single national school. Apparently as a compromise, the conference eventually resolved:

> That this Conference urge the establishment of a Central Forestry School in its present form. That the Central Forestry School be established in a forest within easy reach of a railway, as near as is possible to the Queensland border, and that each student for admission to this school be compelled to serve twelve months' probation in general field work in a State forest, and that his ultimate admission to the school be dependent on the recommendation of the Forestry officer under whom he had been employed.

The matter of higher education in forestry was again discussed at the (seventh) Australasian Forestry Conference in Sydney, September 1924, which resolved: 'it is essential for the development of forestry that a school for professional training be established for the whole of Australia and that this Conference recommends it should be associated with a University within the Commonwealth'.[52] In the same year Lane Poole, as newly appointed Federal Forestry Adviser, had submitted his recommendations to the Federal Government for a Forestry Bureau in Canberra with an education centre to turn out professional foresters as one of its branches. The Forest League in South Australia thought the best place for a school was in Adelaide and lobbied Prime Minister Bruce for Commonwealth support of the Adelaide University school rather than for one at Canberra.[53]

However, in May 1925, the Prime Minister wrote to the Premiers to the effect that, provided the State Governments were agreeable to cooperate, the Federal Government proposed to establish a National Forestry School in the Federal Capital Territory (rather than at Laurel Hill). The qualification for entry would be a two-year science course at any state university except in the case of officers of merit and experience in State Departments, who would be admitted after passing an entrance examination. A two-year course would provide for the award of a diploma. The Commonwealth would provide at its own cost the necessary buildings and equipment, bear the cost of their maintenance and also provide the staff and bear the cost of their salaries and incidental expenses. There would be no fees; no provision would be made for quarters for the students, who would be expected

to arrange their own board and residence; and arrangements would be made to receive twenty students. The Prime Minister also pointed out that the Federal Government was anxious to include the cost in the 1925–26 estimates and would appreciate advice as soon as possible on whether the states would nominate students at the rate of four from both New South Wales and Victoria, three from Queensland, two from Western Australia, and one each from South Australia and Tasmania.[54]

Swain replied that he preferred a scheme for Queensland students of three years' combined university and departmental training, after which selected graduates would go to Yale or Oxford for one to two years. In this way the state would eventually have a staff sufficiently trained in this fashion to do the instructing themselves thus obviating the need to send further trainees abroad or the cost of a special establishment at Canberra. He began to implement this policy by sending abroad some of the first batch of Queenslanders graduating from the Adelaide School in 1926. The *Adelaide Register* reacted sharply to the Commonwealth Government's proposal. It saw the plan for the school as 'ambitious, even extravagant' and any investment by the Commonwealth as being far better directed at expanding the Adelaide School. However, the Prime Minister was able to claim support from some quarters. The Conservator of Western Australia had described the proposal as 'the biggest forward move in forestry since the passing of the Westralian Act', and the head of the Creswick School of Forestry had told a Parliamentary Party, 'we will welcome the creation of a Federal School even if it means the closing of our institution'.[55] Lane Poole visited the states to commend the proposal. Compromises were suggested, such as attaching the school to a university, but since this meant a state university, there being no such institution at Canberra, it was not acceptable to the Commonwealth. Finally, all states except South Australia agreed to the proposal.[56] Adelaide University offered to forego its school (Corbin having accepted an appointment to the Chair of Forestry at Auckland University in May 1925) and generously offered to house the new school until the building planned for it in Canberra was ready for occupation.

The Australian Forestry School

The Australian Forestry School thus began its life at Adelaide University in April 1926, with N. W. Jolly as Professor. There were sixteen students, some private, the others nominees of Queensland, New South Wales, South Australia and Victoria. Jolly resigned at the end of 1926 to become Chief Commissioner of the New South Wales service.

On 11 April 1927, the school opened the doors of its new buildings, the timbers and furniture of which were entirely Australian, at

Westridge (now Yarralumla), a suburb of Canberra. There were sixteen students representing all the states. Three permanent lecturing staff recruited by Jolly — C. E. Carter, H. R. Gray and A. Rule — began duties with the opening of the school in April, and Lane Poole acted as Principal. The formal opening was carried out by the Governor-General (Lord Stonehaven) on 24 November 1927 in the presence of Prime Minister Bruce, a number of other Ministers and Members of Parliament and many other citizens. The students were at first accommodated in the Printer's Quarters, some kilometres from the school. Although the Commonwealth Government had not offered accommodation in its proposal to the states, plans for student quarters were prepared in 1927, but economic conditions were such that the building was deferred and temporary huts constructed near the school. These temporary huts continued as the students' accommodation for twenty-five years until a residential college, Forestry House, located beside the school, with its own sports oval, was completed in 1952. A house for the Principal, the style of which made it a landmark in Canberra, was built in 1928.

In August 1928, the third British Empire Forestry Conference was held in Australia and New Zealand, the final business session for Australia being held in the school buildings. The conference appointed a committee to consider and make recommendations on forestry education in general, and in Australia and New Zealand in particular. The committee was satisfied with the new school at Canberra and recommended that higher training in forestry in Australia be restricted to it. It suggested steps be taken as soon as possible to appoint a permanent Principal. It also strongly recommended that the universities be approached to grant a degree from the student's home university, instead of the Commonwealth Diploma, for the course, which involved two years of science at a university, followed by two years of forestry training at the school. The committee considered at length the need for the State Governments to provide universal support for the school and among its suggestions for ensuring this were the representation of the states on a Board of Governors and secondment of officers of the State services as lecturers. Both suggestions were subsequently effected. At the closing session of the conference, the establishment of the Schlich Medal was announced. Friends of Sir William Schlich, previously Inspector-General of Forests of India and later Professor of Forestry at Oxford, had set up a fund to provide a memorial to his services to forestry and had decided one form of this should be a medal to be awarded annually to the 'best student' at the school.[57] The first winner of the medal was L. J. Rogers of Queensland.[58]

In 1929, W. R. (later Sir Russell) Grimwade set up a fund for a biennial scholarship to the University of Oxford and travel in western Europe, the first award being made in 1930 to T. N. Stoate, who had

graduated from the Adelaide School in 1918 and who was at the time Assistant Conservator in Western Australia.

The Empire Forestry Conference recommendation on the granting of degrees to successful students had been endorsed by the Advisory Committee of the Universities, but by the end of 1930 only the Universities of Melbourne, Adelaide, Queensland and Western Australia had agreed to this and then subject to certain safeguards. A council of representatives of these universities, with Lane Poole as chairman, met in December 1930 and resolved (i) to call itself 'The Board of Higher Forestry Education for Australia'; (ii) that the Board should consist of the Principal and one representative of each university concerned; (iii) that the duties of the Board should be to act as a link between the universities and the school and to advise on curriculum and examinations; (iv) that it should meet not less than once annually at the school; (v) that it was desirable that all students entering the school be able to read French and German; and (vi) that as a thesis was not required for Bachelor's degrees and as the course covered a period of five years, 'it is suggested that a satisfactory report by the student on practical work carried out during the fifth year should be a sufficient qualification for the degree of B.Sc. For.'.[59]

Between this time and 1940,[60] the universities in turn accepted the work within the school as acceptable for university degree purposes, and regulations were made granting a degree to students successfully completing the university and school courses, the Diploma being awarded at the same time for the two school years and the extra field year following them. This acceptance by the universities of the standard of the school and the award of the degree was important to both the graduates and the profession in general.

For several years, economic conditions were such that the Board of Higher Forestry Education was not convened, but contact with the university representatives was maintained by correspondence and Sydney University made an appointment to the Board. In June 1934, a conference in Canberra of representatives of the Commonwealth and those State Governments which supported the school resolved to establish a council to advise on all matters concerning the curriculum of the school. It also resolved that there should be higher forestry education in Australia, that there should be one institution responsible for it, that the Australian Forestry School should be that one institution, that the States supporting it should guarantee amongst them a minimum of five students per year, and that a full-time principal should be appointed. In addition it suggested that an exchange of officers between the State services and the school should be effected.

In 1936, having survived the economic depression, the school faced another threat to its existence: the promises of continued support by the states at its inception had not been fulfilled. Victoria had sent

students in the first few years but none after 1930, and financial difficulties in the other states had prevented or reduced nominations there. The new Commissioner in New South Wales, whose views on the subject had been expressed several times before, favoured:

> making full provision for local staff training arrangements on the score that this will lend itself to an economic mobilisation of the State's educational and forestry resources for the purpose of producing forestry practitioners trained to a higher degree of usefulness in forestry than can an expensive concentration of any academic centre remote from forests, forest industries, universities and forest services.[61]

Accordingly, no students were nominated by New South Wales for intake in 1936. There being only one other first-year student presenting himself, the Principal decided to accept none for that year,[62] and, by arrangement with his Minister, put the staff on half-time lecturing to the four second-year students and the other half time on research. Nevertheless, there was considerable verbal support for the school. The Institute of Foresters of Australia had been founded the previous year. As one of its five principal objects was 'to create and maintain a high standard of qualifications in persons engaged in the practice of forestry',[63] the threat to the school was on the agenda of its first general meeting. A resolution was forwarded to the Prime Minister and Premiers of each state deploring the temporary closure of the school, stressing its importance, asking for an investigation into the inadequate support, and arguing against the states setting up individual schools. The Premiers of Tasmania, Queensland and Western Australia promised support. The Premier of New South Wales forwarded his Commissioner's views, which were endorsed by the Minister for Forests. He also took the opportunity to point out that of the four second-year students, three were from New South Wales (though he did omit to add that they had been nominated by the previous Commissioner). The Institute applauded the previous support by New South Wales and hoped it would continue. There were questions asked in the Federal Parliament, where numerous members and senators endorsed the principle on which the school had been founded and the desirability of maintaining it. A Vice-Chancellors' Conference and the Board of Higher Forestry Education also made representations to the Commonwealth Government to keep the school going. The government agreed to keep it open and to stimulate negotiations with the State Governments to that end. The school opened in March 1937 with no second-year students and an intake of five — three from South Australia, one from Western Australia and one from Tasmania.

Because of the continuing small student intake and the war in Europe (and his own desire to identify more closely with the war effort), Lane Poole was prompted to close the school for the duration

of the war but, on the representation of the Board, the school was re-opened. It kept going with a fluctuating intake for each of the war years, many students enlisting in the armed services immediately they completed the university section of their course.

By 1939, the membership of the Board had been increased to include the heads of the State forest services, the New South Wales Commissioner being nominated to it by the Premier in 1941. In May 1944, an amended Forestry Bureau Act formally constituted a Board of Higher Forestry Education of not more than thirteen members, including the Inspector-General and representatives of a State Government or state university appointed by the Minister. Its powers and functions were merely indicated as those 'prescribed . . . in relation to any educational facilities provided by the Bureau'.[64]

On Lane Poole's retirement, M. R. Jacobs was appointed Principal in January 1945.[65] He remained in that position until December 1959,[66] when he became Acting Director-General of the Bureau. K. P. McGrath was appointed Acting Principal to succeed him.

With the amended Forestry and Timber Bureau Act of 1946, the school became, for administrative purposes, the Division of Education of the new Bureau. This year brought a sharp increase in student intake by those who had interrupted their courses for war service and the intake remained high (at thirty-five to forty) until about 1950 as a result of ex-servicemen taking university rehabilitation courses after their demobilisation. For the next fifteen years the annual intake varied from fifteen to thirty-five. In 1947 the Commonwealth Forestry Scholarship scheme started, students under this scholarship being obligated to serve forestry in some way somewhere in Australia for three years after graduation. 1948 saw the first of a continuing enrolment of Asian students who were later to occupy many of the senior positions in their countries. In 1949, the first of about forty New Zealand Forest Service nominees began an association that was to last for twenty years until a school was opened at the University of Canterbury in Christchurch and the forest service directed its students there. Most of them combined considerable academic capacity with extensive field experience and the Schlich Medal was won by a New Zealand student on five occasions between 1952 and 1958.

In the post-war years, the curriculum followed a fairly steady pattern of two years of basic science subjects at a state university followed by two years of forestry subjects at the school. Some State forest service nominees did a year's field-work between the university and the school. Commonwealth Forestry Scholars were required to have three months' field experience before entry to the school. They gained this experience by working with the State services or the private sector during university vacations. The school program involved three academic terms per year interspersed with a heavy component of local and interstate field-work. For the school part of

the course, the student received a Diploma of Forestry from the Commonwealth Government. Most universities recognised the period at the school in effect as equivalent to a third year at university and awarded a degree for the whole course; for some time some universities required a further year's field-work. Students from other than Australian universities were admitted only if they already had a degree in science or equivalent status.

During the 1950s, a Diploma in Forest Technology was also available for students who aimed at subsequent specialisation in the forest products, wood science or industrial fields. For this, conditions of entry were roughly similar to those for the Diploma of Forestry: undergraduates concentrated on the technological subjects in the fourth year; graduates took one year of special subjects instead of the two required for the Diploma of Forestry. Except in special circumstances, the students were required to live in the residential accommodation provided and supervised by the school but managed for the most part by the students themselves. The Board of Higher Forestry Education maintained surveillance over the curriculum and field-work to ensure its content conformed with the expectation of the forest services, the universities and the Commonwealth Government. The Institute of Foresters also kept a continuous interest. The lecturing and support staff was gradually increased to cope with the size of the student body and the expanding range of material and skills with which the professional forester was expected to be familiar. By 1964, the school had produced more than 500 graduates.

Shortly after World War II, the school staff, the forest services and both past and present students began to press for wider postgraduate opportunities in Australia than were then available. The eighth Australian Forestry Conference of December 1949, held in Perth (the first formal interstate meeting of the heads of forest services for twenty-five years) discussed the matter at length and there was unanimity on the desirability of such increased opportunities. It was noted that the Russell Grimwade Prize was the only local scholarship for overseas study. A suggestion that the Commonwealth Government be approached to suspend some of the Commonwealth Forestry Scholarships in favour of postgraduate scholarships received some support. There were differences of opinion on the most suitable place for postgraduate study (e.g. Europe, North America or Australia itself). Some service heads saw a Commonwealth Research Institute as a necessary first step in postgraduate work. The conference finally resolved that:

> in order that all Governments can ensure that their Forest Departments are adequately staffed with personnel thoroughly trained and experienced in scientific forestry, the Commonwealth Government provide necessary facilities for postgraduate studies, both in Australia

> and overseas, and that the Forestry and Timber Bureau take early steps to establish a Forest Research Institute.[67]

Nothing of this kind having eventuated in the interim, the ninth Australian Forestry Conference (Coffs Harbour, August–September 1953) reaffirmed the view that the Commonwealth Government should 'take early steps to establish a Forest Research Institute and through such Institute provide facilities for postgraduate studies in Australia and overseas'.[68]

Some attempt was made by the universities supporting the school to provide postgraduate opportunities for its graduates. The Universities of Queensland and Western Australia established higher degrees in forestry though they had no formal academic facilities in their structure for them and staff of the school usually acted as advisers, supervisors and examiners, along with members of the forest services of appropriate academic standing, for students taking these postgraduate degrees. Sydney University accepted forestry graduates for higher degrees in science, which restricted the scope of appropriate research topics to some extent. The University of Melbourne provided for the admission of the school's graduates, as well as of its own School of Forestry graduates, towards higher forestry degrees. But the vast majority of students seeking postgraduate degrees sought them overseas, particularly in North America, because scholarships were more readily available there than elsewhere. Although this generous contribution of the North American universities to advancing knowledge and practice in Australia was fully recognised, the profession increasingly felt that the school should be in a position to offer its own postgraduate facilities. The Australian universities associated with the school also, about this time, began to express dissatisfaction with the arrangement whereby they were granting degrees to students over whom the only academic or administrative influence they had in the final two years of the degree was a tenuous one through the Board of Higher Education, particularly as the students spent these two years in a government department (since the Forestry and Timber Bureau, of which the Australian Forestry School formed the Division of Education, was administered as such by the Commonwealth Government). The special arrangements whereby undergraduate training in forestry had been established thirty years earlier were now being seriously questioned. Concern was also often expressed that, despite the advantages of a strong professional corps spirit developed in living and working in close association at the school, the students lacked at a critical stage of their undergraduate life the desirable association with students of other disciplines and the enjoyment of extra-curricular activities which a university campus offers. Also, the staff frequently found it difficult to play the exacting triple role of public servant, professional practitioner and university academic.

The Incorporation of the Australian Forestry School within the Australian National University

The solution to all these matters seemed to lie in the establishment of a much closer relationship of the school with one university or incorporation within it. This was not a new idea; it had exercised the thoughts of the Board of Higher Forestry Education for some years. One possibility had been the Canberra University College, which was established in 1929 in affiliation with the University of Melbourne to provide some tertiary facilities for Canberra residents, but association with it for forestry purposes was thought inappropriate since it was basically oriented to the Arts and Social Sciences. In 1946, the Commonwealth Government established the Australian National University (ANU), which raised hopes in some forestry quarters that at last there was a university of appropriate location, character and academic standing for affiliation of the school, particularly as the University Act contained a provision which would allow the incorporation of the Canberra University College and so, arguably, the school. However, attempts to bring about the actual incorporation of the college with the university were, if not firmly resisted, at least not especially welcomed in some influential circles, and it was thought there was little hope that approaches for incorporation of the school at this time would be any more successful. Although the national role of the school and its long association with the national capital biased thinking towards affiliation with Canberra institutions, thought was given to a relationship with one of the state universities. An arrangement with Melbourne University for postgraduate degrees had limited appeal to some members of the Board in view of the lack of association of Victoria with the undergraduate role of the school, though both the Forests Commission of Victoria and the University of Melbourne had representatives on the Board at this time and for most of the other periods of the Board's existence.

In 1958 the Canberra University College announced it was creating a Faculty of Science with Departments of Botany, Chemistry, Geology, Physics and Zoology, and an approach by the Director-General of the Forestry and Timber Bureau to the college to join the other Australian universities in providing a preliminary two years of science for a BSc. For., when combined with a final two years at the school, received a favourable response. The creation of the Science Faculty in the college also gave a fillip to the argument for complete affiliation of the school with it, and representations to the Commonwealth Government that this be explored, combined with expressions of concern at what was considered a relatively slow rate of development of forestry research in the Bureau, led to the appointment by the government of an inter-departmental committee in February 1959 to consider the future of both forestry education and research. The incorporation of the Canberra University College in the Australian

National University as a School of General Studies in April 1960 appeared to increase the chance of success of efforts to bring the Australian Forestry School into the ANU fold, and in June 1960 the Board of Higher Forestry Education approached the Vice-Chancellor of the university to see if some form of affiliation could be explored which would include retention of the Board. The imposition of this condition was understandable. It had taken years of discussion and effort to get the school to its present position; the balance of forces was delicate.

The key to the balance was the Board, through which the State forest services and the universities could exercise their respective influences on academic and professional standards through course content, general work programs and staff appointments. Even if in practice the exercise of this influence was rarely carried out, the avenue clearly existed. Symbolically, the Board was of considerable importance. Moreover, the school operated under the Forestry and Timber Bureau Act and so did the Board: the one went with the other. Yet the ANU could hardly have been blamed if, given the preservation of the Board as a key condition, it had rejected the approach entirely. Although universities may and often do invite outside advice on academic course content, staff appointments and the like, they do so only when and as they wish; and, with good reason, they jealously guard this responsibility and freedom to run their own affairs. In fact, the university merely pointed out that it saw problems in any arrangement that had the retention of the Board as conditional to it and otherwise responded generously to the spirit of the proposal, immediately setting up internal discussions on possible kinds of affiliation and incorporation.

In early 1961, the Commonwealth Government received the report of its inter-departmental committee on research and education and, to assist in its deliberations over this, asked the University Council for its views on the Board's proposal to the ANU regarding affiliation of the Forestry School with it.[69] The government followed with a suggestion for an arrangement whereby it would continue to finance the school, the Board would maintain its role, and the university would supervise the courses and grant the degrees. The principalship of the school had been vacant for a considerable time because of the negotiations and there were many reasons why the position should be resolved as soon as possible. It was put to the university that under the Act the university could not be represented on the Board but as part of the arrangement it would be asked to cooperate in the appointment. The university indicated that it must, in consistency with the longstanding policy of universities, have control of the curriculum, facilities, finance, administration and staff appointments. The Board could accept the principle but was reluctant to give way to it. Both parties were well aware that the solution to the

problem was to provide a satisfactory alternative to the complex structure within which the school operated and to the number of masters it served — the Commonwealth Government as the source of finance and facilities; the State Governments as the source of most of the students and their subsequent employment; and the state universities which granted the degrees. The obvious thing was for each party to explore within its own organisation and area of responsibility for what might be a workable solution.

However obvious and necessary the move was to most people, the lack of immediate resolution inevitably opened up more issues and sources of views on them, which only increased the complexity of the negotiations. Like most universities in Australia, the ANU has a hierarchical structure of committees and boards, which exert considerable influence on, and are to a large extent responsible for, its academic administration. The university is also governed, to some extent, by the Universities Commission. Consultation with all these elements of the administrative structure was necessary but, as the matter was brought to the attention of each of the successive levels within them, more and more questions were raised, more and more views expounded, and more and more people sought their own satisfaction in any proposed arrangement. The Board of Higher Forestry Education was one problem. The other, of equal importance, was the status of forestry education — especially its suitability as a discipline of a university which had been established originally as an organisation solely for research and postgraduate study, unique in Australia, and in which some original members (who had now become members of the Institute of Advanced Studies) were still sensitive to the merger of the undergraduate Canberra University College (which had now become the School of General Studies) with it. Some academics and administrators, from both parts of the ANU, argued that forestry was a technology and that its inclusion in the university was not only inappropriate but would form a precedent for the establishment within the university of other technologies, which would alter the status of the university and serve to dissipate its funds. Others argued equally strongly that, if forestry were a technology, technology by that definition was already acceptable in major universities all over the world, where it was backed by fundamental disciplines basic to fields of study such as agriculture, architecture and engineering; that forestry had been a respected academic discipline in many eminent universities of the old world for hundreds of years; that it had been accepted as such by Australian universities for years; and that there was a particular case for including it in a national university because, at least for the present, Australia's interests could be best served by one national centre for tertiary education in forestry. The staff of the Forestry School were making similar points about this time to the Committee on the Future of

Tertiary Education in Australia (the Martin Committee) and arguing strongly for its incorporation in the School of General Studies, a view with which the committee agreed at least in principle in its final report, issued in 1964: 'the Committee is emphatic that an association with a university is not merely desirable but essential'.[70]

The ANU thought it appropriate to test the feeling of other universities on the matter, and in March 1962 representatives of many of them looked at a number of possible arrangements. Fortunately for the advances that had already been made in the negotiations, the meeting was agreeably disposed to the association of forestry and the ANU, though understandably, as university representatives, the members saw complete incorporation as the most desirable arrangement. Unfortunately, a number of views were expressed and statements were made which were both inconsiderate and at variance with the facts, and the feelings these engendered in both Board members and others who were party to the long discussions that had taken place on the matter ruffled rather badly what had been to date reasonably smooth negotiating waters.

There was also contention over the curriculum, the Board proposing the kind and standard of course material given during the two years at the school as universally conventional for professional teaching in forestry, the university opposing the number and structure of the units as inappropriate for a university degree. By about May 1962, negotiations might well have been called off had not a working party of representatives of both the Board and the university determinedly set out to find a compromise in the practical aspects of the matter — finance, administration, academic control, location, facilities, curriculum, staff and, in particular, an advisory board. Twelve months later, the Commonwealth Government and the university had reached agreement on a procedure for incorporation of the school in the Faculty of Science of the university. This included the creation of an Advisory Committee on Forestry Education, roughly similar in composition and function to the Board of Higher Forestry Education but which, following the usual university pattern for such bodies, would give advice only to the Faculty of Science. The government indicated it would recommend the proposal to Cabinet if the agreement of the Premiers of the states sending students to the school could be obtained both on the proposal and on the principle that no State Government set up its own school for at least five years. The agreement and assurance were provided by the State Governments, in some cases conditional on the State forest service being represented on the advisory board.

Before the proposal could be submitted to Cabinet, a Commonwealth election intervened, and it was mid-1964 before the new government resurrected the matter. By the end of July, all the interested parties had been consulted and satisfied and in August

1964 the Prime Minister announced that the university would establish a Department of Forestry in the Faculty of Science of the School of General Studies. The Department would teach all four years of a degree course for its own graduates but would continue with the system of accepting for a final two years those students who had completed two years of an approved course at any state university, and it would also engage in research and postgraduate training. There would continue to be an advisory body on forestry education, and the existing teaching, technical and clerical staff of the school would be offered appointments at an appropriate level in the School of General Studies. All of the State Governments except Victoria had indicated they were prepared to make use of the new university department to meet their needs for a basic degree in forestry for their forest service officers at least until 1969.[71]

The Department of Forestry, Australian National University

Arrangements for the ANU to take over the functions of the Forestry School were so made that the new Department of Forestry could commence its activities in the 1965 academic year. A Professor (J. D. Ovington) was appointed, the permanent lecturing staff was increased, the curriculum was revised and planning was commenced for new buildings on Linnaeus Way of the university campus with funds specially provided by the Commonwealth Government for the purpose. Meanwhile the new department continued to function at the school in Yarralumla and in temporary buildings on the university campus. The new buildings, which featured generous gifts of wood from national and international forestry and industrial organisations, were opened by the Duke of Edinburgh on 16 May 1968.

The traditional arrangement for undergraduate teaching was retained at first (two years of approved science subjects at any Australian university, along with appropriate field-work, followed by two years of forestry subjects in the department), the degree being issued by either the home university or the ANU as the student elected. In 1969, by agreement with the nominating authorities and the universities, this was changed to a one year/three year arrangement, the degree of BSc. (Forestry) being issued only by the ANU. The Faculty of Science approved a special arrangement whereby students could carry out an Honours program concurrently with the third and fourth years of the undergraduate course, including the intervening long vacation, on the grounds that the undergraduate course was already four years long and five years where a field year was included. In 1970, a conventional fifth year Honours program was introduced as an alternative.

With the start of the new department, annual student intake increased to forty, rising to upwards of eighty over the next ten years. Undergraduates were, with rare exceptions, sponsored by the Com-

monwealth and State Governments and a few private forestry organisations until 1969. With the general increase in numbers, the percentage of non-sponsored students increased and, by the late 1970s, sponsoring by scholarship specifically for forestry had itself been gradually phased out. For some time, the department maintained the traditional component of inter-term field-work in the states, which was possible because of the generous support of the sponsoring organisations through student fares and allowances. As costs rose through economic inflation, it became increasingly unreasonable to require non-sponsored students to meet the expense of the considerable field-work and reluctantly the department had to reduce it in frequency and scope. The need to conform to the university's curricular program, and also to afford students the opportunity during inter-term periods for extra-curricular activities associated with university life (which had been an argument for the incorporation of the school within a university), also led to a reduction of the field-work which had been a feature of the school. Because of their greater number and the limits to employment in traditional fields, graduates increasingly began seeking employment outside those fields particularly in the various allied areas of land resource management. To accommodate both this and the increasing pressure by society on foresters in traditional fields to expand their traditional roles, the 1970s also saw a continuous modification and expansion of the curriculum.

Because a major reason for the incorporation of the school in the university had been to provide more ready opportunities for postgraduate training, immediately on its establishment the department began encouraging students to take advantage of the existing MSc and PhD structure of the university. As this program developed, it became clear that most of the work was oriented to research and little towards the practical management of forests, in its many forms, to which the main thrust of undergraduate teaching is conventionally directed and into which an infusion of higher-trained practitioners has been shown in other fields of management, and in forestry in other countries, to be of considerable value. On the grounds that a closer balance was desirable and that practising foresters might be more attracted to postgraduate study with a high component of coursework than to a degree by research thesis, an MSc in forest management by course work was instituted in 1974.

By the late 1970s, the Department of Forestry had become the largest in the Science Faculty and the third largest in the School of General Studies, with the largest postgraduate component. The full-time academic staff of five at the time of incorporation had grown to twenty, the majority of whom had doctorates and international experience. There had been over 500 graduates at Bachelor's level, of whom more than 100 had taken the Honours degree. The first female

student (Miss Lea-Ann Scott) graduated with Honours in 1973. There had been over ninety MSc and PhD students, though less than a quarter of these were members of an Australian forestry organisation.

Forest Products Research

Since the main function of the early forest services was the supply of the major and minor products of the forest, matters such as the correct identification of Australian trees, the most appropriate use of their woods and other products and research into their physical and chemical properties were of obvious concern. As early as the second Interstate Forestry Conference in 1912, the services were emphasising the need for the publication of authoritative descriptions of Australian woods to assist users to obtain wood that was true to name and specification. At the next Interstate Forestry Conference in 1916, there was considerable discussion on the need for a bureau of research into 'forest and vegetable products' led by R. T. Baker, Curator of the Technological Museum of New South Wales, who had pioneered work into various minor products, particularly the essential oils of the genus *Eucalyptus*. At his urging, the conference drew 'the attention of the Commonwealth Scientific Bureau to the omission from its list of inquiries of research work in connection with forest products and recommends that special research work in that direction be undertaken'. The establishment of a 'Research Bureau to ascertain the commercial possibilities of our forest and vegetable products' was also advocated by W. A. M. Blackett, then President of the Royal Victorian Institute of Architects, at a Conference on Australian Timbers in Melbourne in 1916[72].

A paper on 'Education in forestry and forestry research' by Jolly at the fourth Interstate Forestry Conference in 1917 stimulated considerable discussion on the need for research into forestry and forest products and on the question of whether an institution for the training of foresters should be associated with it, the conference finally recommending 'that the Commonwealth establish an institution for education in forestry and forestry research work'. At this stage, Lane Poole (whose views on the location of institutions for forestry research, forest products research and the education of foresters were to vary considerably over the years) was arguing strongly, as the new Conservator in Western Australia, for forest products research to be located in that state, and it began there as a result of his promotion of it. A timber-seasoning kiln was installed at the Engineering School of the University of Western Australia, in conjunction with the Forests Department, and investigations into pulp and paper manufacture from local woods began at Perth Technical School under I. H. Boas, who was lecturer in chemistry there.[73] Both these steps were taken largely under the aegis of Lane

Poole, who headed a forest products sub-committee of the Advisory Council of Science and Industry which the Commonwealth Government had been persuaded to set up in 1916 to advise it on the application of science to industry in view of the emergencies of the war.

In 1919, the West Australian Government offered both a site in the university grounds for a forest products research laboratory and a grant towards the building; and various other organisations, including the forest services of the other states, promised support. Boas was placed in charge of Commonwealth forest products investigation for the Council, and a systematic investigation of the pulping properties of various Australian woods at the Perth Technical School began under L. R. Benjamin, along with work in tanning materials and in seasoning and preservation. Boas went overseas to visit forest products research centres and returned in 1920, temporary accommodation for the expanding work of the new research group being obtained in other laboratories in Perth. While the formal creation of an Institute of Science and Industry awaited legislation, which was passed later in 1920, Boas was outlining a plan for a laboratory and its research program (which could be set up at Perth on the basis of the State Government's offer of 1919) to the fifth Interstate Forestry Conference in 1920. The delegates strongly commended the early implementation of the plan to the Prime Minister.

Despite the formal establishment of the Institute by the 1920 Act, finance was not forthcoming for the research which the Advisory Council had planned, and Boas resigned in 1921 to take up a position in industry. Responsibility for the direction as well as the execution of the pulp and paper investigation fell on Benjamin, and his group progressed successfully at a rate which necessitated semi-commercial testing. Facilities for this were offered by Australian Paper and Pulp Co. at Geelong, so that pulp and paper-making were transferred there in 1922, the research activities moving to Brunswick Technical College near Melbourne, along with the tanning investigations, in 1923.[74]

The sixth Interstate Forestry Conference in 1924 offered the opinion that it was 'desirable that the Commonwealth Institute of Science & Industry should be so extended and equipped as to include in its work special research in connection with all forest products', a view which was professed by Sir George Knibbs (then Director of the Institute and the Commonwealth representative at the conference) but not shared by Kessell (the new Conservator for Western Australia). Kessell felt strongly that the forest products laboratory should be self-contained under a professionally qualified man with a forestry outlook and not part of a general research laboratory dealing with a great variety of primary industry problems. This was an understandable attitude in view of the fact that to this stage it was the work on

forest products that formed the major claim of the Institute to success.[75]

A new interest in research and its applications to industry was stimulated in 1923 with a change of Federal Government, and in 1925 Prime Minister Bruce convened and presided over a conference of State and Commonwealth academic, industrial and political leaders to consider what reorganisation of the Institute and its Council was necessary.[76] Sir Frank Heath, Secretary of the Department of Science and Industry Research in Britain, was invited to Australia to report on the matter, which he did in 1926, making a number of recommendations regarding the purpose, functions, structure, direction and funding of a reorganised institute. Amongst the various sections which he recommended should be established and headed by special scientific officers was a Forestry and Forest Products Section, with a Silviculture Division at Canberra, which was to be the Section's headquarters, a division for minor forest products at Adelaide, one for wood waste in Western Australia and one for seasoning and preservation in Queensland. He stressed the importance of keeping the forestry and forest products research under a single 'intellectual control' and basing the research into forest products on the experience and practice of the trained forester rather than on that of 'the timberman, engineer or chemist'. He also thought it 'no less important that the headquarters of the Section devoted to forestry and forest products, especially the laboratories and records for silvicultural research, should adjoin and be in continuous touch with the Commonwealth School of Forestry'.[77] A Science and Industry Act in June 1926 set up a Council for Scientific and Industrial Research (CSIR) to replace the Institute, and the Council held its first formal meeting the day after Royal assent was given to the Bill.[78]

The Federal Government thought it should get further advice on the matter of the forest products laboratory, and A. J. Gibson, the Conservator of Forests, Lahore (India), was invited to visit Australia and report on it.[79] Gibson arrived in August 1927 and reported in December along the same lines as Heath but went even further: he argued the need for such a laboratory, recommended it be at Canberra near the Australian Forestry School under the same authority as the school and the proposed Forestry Bureau, and suggested that, once it was in working order, forest products research work in the states should be closed down to save energy, time and money.[80]

With government approval a Division of Forest Products was founded by CSIR in July 1928, and Boas was appointed its first Chief. For some time, the activities of the new Division were well scattered. The investigations at the Brunswick Technical School were taken over; a pilot tannin extraction plant was established in 1928 at the Western Australian University, supported by the Forests Department; preservation research began in Western Australia in 1929; and

wood chemistry and technology research commenced at the Forestry School at Canberra.[81] A policy of encouraging and funding the Division's officers to gain overseas experience resulted in overseas studentships for H. E. Dadswell to study wood chemistry and J. E. Cummins to study wood preservation at one of the world's foremost forest products laboratories at Madison, USA. Boas went overseas again, returning to administer the laboratories in early 1929.

There had been some pressure of opinion in forestry circles that the laboratory, whenever it was established, should be located in the national capital. Both Heath and Gibson had strongly recommended this and there was some support for this view from scientific and political circles. But, as a Division mainly oriented to research directed at the use of wood, there were strong arguments for its location closer to industry than Canberra was and sites for new laboratories were selected at first near Melbourne and then Sydney. These did not come to fruition because of the economic depression and, as an alternative, laboratories were set up at CSIR's head office in East Melbourne, where seasoning and utilisation work began in June 1929.[82] In 1930, the tannin work was transferred from Western Australia to Melbourne and so was the chemical and wood technology work from Canberra, a move which was regretted, because of the loss of Dadwell's research and lecturing at the Forestry School, by Lane Poole, who still hoped that the 'permanent establishment of the Forest Products Division at Canberra will not be long delayed'.[83] However, the developing Division, which added a Timber Physics Section in 1932, was seeking a permanent home in Melbourne and, on a site on Yarra Bank Road leased from the Victorian Government, with a grant from the Commonwealth for new laboratories, donations of timber from industry for them, and donations of money from Russell Grimwade for equipment, it founded a home there in 1934–36 which it was to occupy for many years and where it was to develop a reputation second to none in the international field of forest products research.

A Veneer and Gluing Section was founded in 1938–39. In early 1940, a swing started to timber control and research oriented to the war, Boas (as Chief of the Division) having been appointed Assistant Timber Controller under the Directorate of Materials Supply and backed by the services and facilities of the Division. Boas retired in early 1944, his place as head of the Division being taken by S. A. Clarke, who had been in charge of the first seasoning work at the Western Australian University as seasoning officer of the Forests Department, had joined the Division in 1930, and had become Deputy to Boas in 1931.[84]

From the first it was clear that, to meet the main needs of the country, the major thrust of the Division should be to organise what was known about the properties and best uses of Australian timbers

and to encourage industry to direct its practices in accord with this information, all the while gradually extending its pursuit of new knowledge. By the post-war period, after nearly twenty years of setting standards for wood use, collecting, identifying and describing Australian woods and responding to continuous demands for services from an industry which was becoming increasingly interested in the best use of wood, the Division was in a position, and the demand was there, for a considerable increase in fundamental research, and it moved in that direction.

In 1946, the first Forest Products Research Conference was held, which set the practice of frequent meetings of the Division with representatives of the State forest services and other forest products research groups to discuss work of mutual interest and to organise a program and priorities of research. In 1956, faced with overcrowding, the Division expanded into two adjoining properties. Clarke retired in 1960, and a review committee set up by the Advisory Council in 1959 having recommended a continuation of the Division's program, Dadswell was appointed Chief. On his death in 1964, the Division was directed by J. D. Boyd for a period and then by a committee for a further period until R. W. Muncey, Acting Chief of the Building Research Division, was appointed Chief in 1966.

The original location of the Division in Yarra Bank Road was central to the Melbourne timber and wood processing industry but, with time, this became less the case and, after considerable search for a site more suited to the continually expanding Division and less subject to the problems of inner-city location, a large area at Mulgrave near Mount Dandenong was purchased in 1968. Although plans for its development were drawn up, the site was not occupied.

In the late 1960s, the future of the Division came under active consideration by the CSIRO Executive and in May 1971 a major reorganisation took place in which the Division, one of the earliest in the organisation and one of the leading institutions of its kind in the world, with fifty years of valuable achievement behind it, lost its identity. Those research groups of the Division concerned with physiology and paper science were transferred to the Division of Applied Chemistry. The other research groups, mainly concerned with wood as a building and structural material, were transferred to the Division of Building Research.

The Australian Capital Territory

The native forest cover of the Federal (later Australian) Capital Territory (ACT) was mainly composed of woodland on the plains and foothills, and of wet sclerophyll forest in the mountains at an elevation of 900 to 1500 metres, both types almost wholly of eucalypt species. The early settlers ringbarked a large proportion of the woodland areas for pasture and these trees formed a major source of

fuel for domestic purposes in Canberra up to the 1960s. The settlers also used the native species for fencing and farm buildings. The first sawmilling in the better mountain forests (of *E. fastigata*, *E. gigantea*, *E. viminalis* and *E. dalrympleana*) took place about 1910 near Tidbinbilla and then was of a minor nature.[85] Much heavier use of the mountain forests commenced in 1947 in the post-war building boom in Canberra, logs being transported upwards of 60 km to a government mill in Canberra. Logging continued there until the early 1960s, by which time supplies were almost exhausted and the forests were closed against further utilisation particularly in view of their role in the protection of the catchment of the Cotter River, the main source of Canberra's water supply.

In 1915, T. G. C. Weston, Officer-in-Charge of Afforestation and later Superintendent of the Parks and Gardens branch, began trials of numerous species in Westbourne Woods and also the establishment of radiata pine on the slopes of Mount Stromlo, both to reduce the effects of erosion caused by grazing and rabbits and to enhance the aesthetics of the environs of the developing national capital.[86] Although the advice of several authorities was sought on the potential for forestry in the Australian Capital Territory during 1917–18,[87] the first report to have a major administrative effect was that of Lane Poole, as Commonwealth Forestry Adviser, in 1924. As a result of it, the Federal Capital Commission in 1925 created a Forestry Branch (the old Afforestation Branch becoming the Parks and Gardens Branch), with G. J. Rodger as Chief Forester, to plan and implement an industrial forestry program. From then until 1945, the Branch was advised and to some extent supervised by the Inspector-General of Forests through the Forestry Bureau; from 1950 to 1965 it was directed by the Director-General of the Forestry and Timber Bureau, of which it formed the Division of ACT Forests; otherwise it has come within the general ambit of whatever department was responsible at the time for the administration of the Australian Capital Territory.

On Lane Poole's advice, Rodger set an annual planting program of 200 ha with a forty-year rotation, starting in 1926 at Uriarra and Pierce's Creek in the Cotter Valley, which was eroding as a result of clearing and the effects of rabbits, and at Kowen, in the north-eastern corner of the Territory close to Queanbeyan and the Sydney–Canberra railway line, where old grazing land had been taken over by wattle. Most of the planting was of radiata pine, but some of it was of various strains of western yellow pine, and arboreta of numerous species were established in the mountains over a range of altitudes. By 1938, an annual planting rate of nearly 400 ha had been achieved, and the reduction in erosion in the Cotter catchment as a result of the planting there had attracted very favourable comments from visiting hydrologists.

In 1939, the program suffered a serious setback when an area of about 1600 ha of plantation was burnt in the disastrous fires which occurred over much of south-east Australia in that year. The planting was justified in the next several years when war-time demand was so strong that even thinnings which had lain on the forest floor for four years were taken by a hungry market, and after the war when locally produced wood played a major role in the post-war building boom. The plantations suffered double reverses in January–February 1952 from disastrous fires, started by lightning, when more than 400 ha, including most of Mount Stromlo, were burnt, and from extensive windblow a few months later, following weeks of heavy rain and persistent gales, which exacerbated the salvaging problem already posed by the fires. Pilot plots were established at Jervis Bay in 1955 with a view to putting some of the poor land on the coast into production and contributing to wood supply in an area of rapidly increasing demand. By the mid-1960s, the growing extent of the plantation estate, the age of the early plantings, and the erratic demand for wood in the Territory because of the stop–go nature of government programming for the development of Canberra, posed the need for a stable industrial organisation and permanent contracts for supply. In 1967, Cabinet approved a plan for a total of 16,000 ha of radiata pine and negotiations for an integrated industry in the ACT. The industry was established in 1970 and by the end of the decade the planted area was approaching that target.

Because of the fast growth of Canberra, the particular nature of its population, and close location of the plantations relative to the city, it was inevitable that the plantations would be seen by the people as an obvious source of recreation, and effective solutions to the pressures for the integration of a wide range of recreational pursuits with wood production have been uppermost in the planning and a highlight of the activities of the Forestry Branch in recent years.

Over its fifty years of operations, the Branch has had a number of heads: G. J. Rodger, 1926–27; M. R. Jacobs, 1927–29; C. R. Cole, 1929–40 and 1945–60; L. D. Pryor, 1940–44; R. G. Green, 1960–62; W. Bateman, 1962–63; and M. Edgerley, 1963–81.

The Northern Territory

Early Settlement

Whatever the modern Northern Territory may lack in the way of settlements and development is not due to the lack of early good intentions. The survey of the north coast, which Matthew Flinders in his circumnavigation of the continent had been forced to abandon in 1803 by a failing ship and the ill-health of himself and his crew, had largely been completed in 1818–22 by Governor King, who strongly recommended the occupation of a port in northern Australia. The loss of Java and the arguments of influential merchants, which had gone

on for some years, for a mercantile platform on the north coast as a substitute for it, prompted the government to despatch Captain Bremer in 1824 to establish settlements within Apsley Strait (between Melville and Bathurst Islands) and at Port Essington on Cobourg Peninsula. Coming via Port Jackson, where he picked up marines and convict volunteers, he first sought a site at Port Essington, which was one of the few places which had favourably impressed King. However, since it lacked a water supply, he moved to Apsley Strait and found a site on Melville Island where there was 'a plentiful supply of water for both settlement and ships, timber was abundant and some he considered fit for naval purposes'.[88] Despite the auspicious description, this small colony of Fort Dundas suffered continuous hardship, the complaints of the Commandant, says F. H. Bauer, being 'a classic soldier's gripe list' but reflecting 'precisely those [factors] which have vexed the north from that day to this'.[89] In 1828 the site was abandoned in favour of one on Raffles Bay (east of Port Essington). This in turn was abandoned in 1830 in favour of a site on the Swan River in Western Australia. Port Essington was re-occupied in 1838 at Victoria in response to rumour that the French intended to settle on the north coast; but when this threat evaporated, and little trade with the Malays had eventuated by 1849, this settlement too was abandoned.[90]

From the time of the first settlement at Port Essington, suggestions were made for a land expedition to make a route to it from New South Wales, and Ludwig Leichhardt, stealing a march on the official party getting ready under Thomas Mitchell which he had originally hoped to join, led his own expedition there in 1844–45. Ten years later, A. C. Gregory traversed part of northern Australia from the Victoria River to the Queensland coast, F. M. von Mueller, who accompanied him, collecting and describing a number of eucalypts on the route.[91] A few years later still, John McDouall Stuart crossed the continent from south to north with enthusiastic accounts of the 'Top End'.

These accounts, supported by similar ones from some of the other land explorations, were to inspire the next wave of enthusiasm for settlement, but from internal rather than external sources. In 1863, after several years of territorial bargaining amongst the interested colonial parties, a somewhat vaguely defined area west of longitude 138° named the 'Northern Territory' was temporarily annexed by the Crown from New South Wales to South Australia. The South Australian Government quickly took steps to colonise it through the sale, simultaneously in Adelaide and London, of land orders for 100,000 ha of urban and rural land which it proposed to survey for settlement. B. T. Finniss (recently Premier of South Australia and originally its Deputy Surveyor-General) was appointed by the government to be first Resident of the new settlement, and he led an expedition to found it at Escape Cliffs in 1864. The site was hopelessly unsuitable, and the

members of the expedition abandoned it and Finniss was recalled. The government moved to a further issue of land orders, and in 1868 sent Surveyor-General Goyder to survey a township at Port Darwin (which had been discovered and chartered by Captain Wickham in 1839). The survey of Darwin (at first called Palmerston) was not completed within the time specified in the conditions of the land orders and many land-order holders demanded their money back. By the time the survey was completed, interest in settlement had waned considerably.[92]

The construction of the overland telegraph line connecting Adelaide with Darwin which, via Java, provided telegraphic communication between Australia and Europe for the first time, gave the Territory new importance in 1872. Its construction also led to the discovery of gold, which brought a boom, but one that quickly died for want of both labour (despite the introduction of Asian people for the purpose) and sufficient gold. A trans-continental railway, which was regarded as essential for development, was begun in 1886 but the cost and difficulty of constructing it soon brought its abandonment. By Federation, the Territory had become something of a financial burden to South Australia, which saw in the new political arrangement a possible opportunity to unload it. After negotiations which began in 1906, the area was formally transferred to the Commonwealth as the Northern Territory of Australia on 1 January 1911.

The Forest Resource

The construction of the overland telegraph line brought to notice three characteristics of the Territory which have remained pertinent to a consideration of forestry there ever since.

One characteristic was the dearth of suitable trees for poles and construction timber along or in the general vicinity of the route. Set in the tropics, with which lush vegetation is conventionally associated, the northern part of the Territory is in fact characterised by a dry monsoon climate with markedly seasonal rainfall (practically all of a 1500 mm annual total falling between November and April) and by leached, acidic soils low in nutrients and unable to store sufficient moisture to carry over for the dry half of the year to support anything but a meagre forest. Inland, the rainfall decreases fairly rapidly until it is almost nil in the south. As a result, as W. Bateman reported in 1955,[93] the greater part carries no trees or only scattered, stunted ones, the forest cover being composed of four broad classes: (i) open eucalypt forest as the dominant vegetation, with restricted occurrence of commercial timber; (ii) patches of cypress pine (*Callitris*) within the eucalypt forest; (iii) paper bark (*Melaleuca*) forest on swamplands and along streams; and (iv) small patches of rain forest along streams and around the fresher swamp lands. *Acacia* spp. occur in thickets throughout, being denser in the heavier rainfall zones. For

timber utilisation, main interest must centre on a limited area of tall, open eucalypt forest in the north-western corner around Darwin and on Melville Island, and on the scattered occurrences of cypress pine.

Lacking local sources of suitable wooden poles, the authorities were forced to cart them from elsewhere over long distances. But the poles were quickly ravaged by termites, and soon the Territory became well-known for these populations of 'white ants'. Some species cause considerable destruction of standing eucalypts. One genus, *Mastotermes*, has a legendary reputation for its voracious appetite, not only for wood, but for almost any kind of material.

Where the wooden poles were not eaten by termites, they were burnt by bushfires. During the wet season, there is in most years considerable and extensive growth of annual grasses and other ground-cover species, which cure readily in the dry season which follows, and the vegetation of much of the Territory has been subjected for a long time, and is still subjected, to very frequent burning by the Aborigines, Europeans and lightning.[94] As a result, many trees which might otherwise be useful for wood production are rendered useless either by the burning or by the fungal or termite attacks which follow it. Mature cypress pine is sensitive to fire, its regeneration even more so, and the present limited distribution and mediocre quality of the stands of what would otherwise be a very valuable tree in the area are largely the result of the destructive fire history of the area.

The limited extent and special nature of the forest resource of the Territory, and its susceptibility to the attacks of fire and termites, are essential background to a consideration of the development of forestry there.

The Development of Forestry

Every attempt at settlement and development over the years was accompanied by wood-gathering from whatever source provided an immediate economic supply and, by the turn of the century, most of the stands within a reasonable distance of Darwin, and along the telegraph and railway lines, had been picked over.

Once the Commonwealth Government's interest in the forestry of the nation, which began in tentative fashion in the early 1920s, had become established, it widened to include the Northern Territory, and in 1933, M. R. Jacobs (as an officer of the Forestry Bureau) carried out a reconnaissance along the main trans-continental traffic route, reporting on the timber supply and making 'recommendations for the inauguration of a forest policy for the Territory'.[95] A special report on the eucalypts found in the reconnaissance was issued, in which he commented that there was 'little likelihood of an export trade in any timber except sandalwood being developed in the Northern Territory'; the timbers were 'of value from the viewpoint of the internal economy

of the colony only but, if the anticipated, modest development of the Territory eventuates, this will be of some little importance in itself'. He considered the most valuable timbers were not eucalypts but cypress pine and ironwood but these did 'not occur south of Arnhem's Land and supplies of them are so limited that settlers will have to depend on eucalypts if the Northern Territory develops to any extent'.[96] As a result, in the following year, C. E. Lane Poole (as Inspector-General of the Bureau) recommended policy initiatives to the government. He saw an ecological survey by a forester as the key to the proper allocation of land for agricultural pursuits and a cypress pine planting program as the most constructive measure.[97] For the next several years he continued to press the government to formulate a policy for the Territory, but without success; and ten years later the Territory was no longer worth even a mention under 'Advisory Functions' in his annual report to the Parliament.

By that time, World War II had started. Interest centred on Darwin as a strategic centre, and operations by the armed forces and the civilian Allied Works Council established a demand for wood for a wide range of uses, which was met again by the process of picking-over but on a wider scale and less inhibited by economic restraints. A reconnaissance by A. W. Shillinglaw for the armed forces in 1944, between the Daly River and Cobourg Peninsula, led him to report that the 'Territory is poorly endowed with timber supplies necessary for Army requirements and its future development'.[98]

For a few years after the war, any utilisation was supervised by Lands Officers of the Territory Administration. In 1950, W. Bateman was appointed Forestry Officer for the Territory within the Forest Resources Division of the Forestry and Timber Bureau in Canberra,[99] which was responsible for advising the Administrator of the Territory on the management of its forests, and he began reconnaissances to locate the more important timber stands and to collect botanical specimens.[100] D. A. N. Cromer, then in charge of the Division of Forest Resources, visited the Territory in 1951 and reported that:

> with the exception of the Gulf Country (about which factual information is lacking), the Northern Territory is very poorly endowed with saw timber. Nevertheless, the annual requirements amount to only about 750,000 s. ft. and it is considered that this quantity could be met from local resources for at least a decade.[101]

For the next few years, the annual reports of the Bureau show Bateman finding and reporting on small, widely dispersed stands with limited present or potential sawlogs. In 1954, the first mention was made of a site being selected 'for the establishment of trial plots of exotic pines'.[102]

In 1955, the Bureau published a report of Bateman's investigations of the previous several years into 'the extent of the forest resources in the Territory, their potentialities and the possibility of developing them'.[103] In an introduction to this report, G. J. Rodger, then Director-General of the Bureau, considered that:

> the most important work to be done at the moment is to study the silviculture of the species ... of likely commercial value, test the suitability of exotic species, proclaim the areas to be devoted to forest production and institute sound forest management on such areas'.

He had made recommendations to this end to the Administration and 'confidently anticipated' that in due course the Territory would 'produce at least its own requirements in forest products'. Bateman pointed to the spasmodic utilisation that had been going on over the scattered resource for eighty years. Ten sawmills operating in 1953 had a combined output of only 'one and a half million s. ft.' per annum, including re-sawn timber (the annual production of one medium-sized sawmill in east coast eucalypt forest) owing to the scattered nature of the log resource, difficult access, the wet season, which made bush work impracticable, and the difficulty of getting suitable labour. The stage had been reached, he said, when:

> most of the readily accessible resources have been exhausted ... the forests of the Territory ... generally are depleted ... have deteriorated ... and are not regenerating adequately owing to the repeated burning which is such a common practice throughout the Territory.

Arguing that importing was precarious since it depended on the availability of surplus elsewhere and on shipping, and that imported timber was likely to be more costly, he suggested that the timber requirements of the Territory should be produced within it 'as far as it may prove practicable'. Estimating the annual timber needs of the Territory at the time as 6 million super feet (round volume) and the mean annual increment of the resource, given adequate fire protection, as 50 super feet per acre, he saw a need for 120,000 acres of reserved forest. But, allowing for losses caused by fire, insects, fungi and drought, and for future population increases and expanding industrial development, he suggested the reservation of at least half a million acres as close to the centres of consumption as was commensurate with the occurrence of suitable sites in the way of soils, climates, etc. From his investigations to date, he identified about a quarter of a million acres as worth reservation for wood production and as protection forest. The amount of milling timber on that area totalled less than 30 million super feet.

Trials of likely species for afforestation purposes now began. In the light of events twenty years later, a comment in the Bureau's annual report for 1956 had a prophetic note:

> in view of the particular climatic regime in the coastal portion . . . the initiation of any afforestation projects will need to be undertaken with great care and forethought if large losses and wasted expenditure are to be avoided. For these reasons, trials of exotic species from similar climatic zones will need to be made over a period of years, in addition to experimental planting and regeneration treatment of suitable local species, before any large-scale work is attempted.[104]

During the 1950s and early 1960s, enthusiasm and a sense of national need to develop Northern Australia had become pervasive in some political, bureaucratic, professional and public circles. People from all sorts of quarters were arguing for 'northern development' for all sorts of reasons. Bodies such as the North Australian Development Committee (representatives of the Commonwealth and State Governments) had, shortly after World War II, emphasised the need for basic research before plans for development could or should be formulated, echoing the pre-war warnings of A. G. Price[105] that Australians should 'cease boasting about the vast undeveloped potentialities of tropic Australia' and key whatever development was possible in the region to the accumulation of scientific knowledge of it. By the early 1950s, knowledge of the economic resources and the problems of developing them had been greatly expanded through government-sponsored programs, and this stimulated further political interest in the development of the region, and in its indigenous people (as exemplified by the formation of the Native Welfare Council by the Commonwealth and State Governments). By 1954, as one of its former chairmen was prompted to observe, the Australian Institute of Political Science had gone beyond any questioning whether and why the North should be developed and was merely asking at its Summer School of that year, 'How should we develop Northern Australia?'

In a heady introduction to the printed proceedings, he said:[106]

> I think this question of the development of Northern Australia requires above all an intense propaganda campaign. All of us at the Summer School were resolved that we would do our best in any way we could . . . to convince our fellow citizens of the flagrant need for a large proportion of the resources of men and capital of this Country to be concentrated on the development of the North.

It was, he said, 'A Task for a Nation', reflecting the remarks of Governor-General Slim, who opened the school with the thought 'if twelve hundred million pairs of eyes looking hungrily for land see to

the south of them a million square miles occupied by only 100,000 Australians, sooner or later they may not be content with looking'.

Within a decade, F. H. Bauer[107] and B. R. Davidson,[108] for example, were to be demonstrating in critical detail the extent to which the 'myth' about development in the Territory became 'reality' to a large section of the Australian people, particularly people in important bureaucratic and political places, and were to be claiming that yet again a considerable body of funds had gone towards what seemed largely misdirected and expensive experiments. But, given the persuasive enthusiasm of the time, it is understandable how, despite the previous unpromising assessments of the forest resource, the Director-General of the Forestry and Timber Bureau was able to report in 1958:

> proposals were prepared for a forestry programme sponsored by the Honourable the Minister for Territories. Subsequently Cabinet approved of a five-year program of research into the forest potential of the Territory. The program covered the appointment of six professional and technical officers.[109]

The program was the result of joint recommendations of the Bureau and the Department of Territories, to be administered on behalf of the Territory Administration by a forestry section temporarily within the organisation of the Bureau.[110] The understanding was that the 'forestry program would be initiated by the Bureau and handed over to the Northern Territory Administration as a going concern after five years'.[111] This 'first' program, as it was called, was three-pronged. It included an investigation of the extent, growth and appropriate management of stands of indigenous species; small trial plantings of local species, and the introduction and subsequent trial of exotic species considered appropriate to the climate; and the employment and training of 'aboriginal wards' through the advice and assistance of the Welfare Branch of the Northern Territory Administration.[112] The Welfare Branch saw a forestry program as the sort of constructive and gainful employment for its Aboriginal wards that it had been looking to provide and, after only two years of the research program, the Administration had expanded its initial involvement into a four-year Welfare Forestry Program, which provided for the establishment of five Forestry Project Settlements on Aboriginal Reserves, the initial employment of seventy-four wards in the first year on logging, milling, roading, fire protection and silviculture of cypress pine stands, and the appointment of two professional foresters, seven non-professional officers and seven industrial employees, to supervise and assist.[113] As this new program expanded, the Bureau continued to remind the government that such a mixture of basic forestry research and an attempted solution to the assimilation and employment of

Aboriginal people, with all its attendant sociological problems, should not be judged on conventional economic criteria.

In 1965, in terms of the arrangement of 1958 for the program to be initiated by the Bureau and handed over after five years to the Territory Administration, a submission was made for splitting up the research and operational activities of the unit and for future programs. In May 1966, the Minister for Territories announced a four-year development program, part of the government's long-range plans for forestry in the Territory, designed to increase softwood planting from the present level of 140 ha per year to 400 ha per year at the end of the period. The program would involve greater use of indigenous forests, the extension of general forestry services such as research, assessment, conservation and fire control, and the training of Aborigines in forestry techniques, which would promote the policy of assimilation by creating worthwhile employment opportunities.[114] This 'second' program also directed that a State-type forestry organisation be established with the Territory Administration.[115]

In July 1967, as part of the program, a division of staff and responsibilities took place in what had become the Forestry Section of the Forest Research Institute of the Forestry and Timber Bureau of the Department of National Development. A Forestry Branch of the Territory Administration was established to include those members who had been engaged in management-type activities. Those who had been engaged in research-type activities were retained as the nucleus of a Northern Regional Research Station of the Forest Research Institute (at Canberra).[116] The main responsibility of the new Forestry Branch was to manage the indigenous forests and the cypress pine plantations which had been established in the various project areas. The function of the Regional Research Station was research into afforestation by tropical conifers, the growth and yield of the indigenous forest, and silvicultural treatment of the cypress pine plantations[117] (the last function being taken over in 1969 by the Forestry Branch,[118] which by then had a small section carrying out applied research).

Although public mood at the time may or may not have been fairly reflected in an optimistic report by the local press that 'the plantations established during recent years by the [Forestry and Timber] Bureau had shown that Forestry would become a major Territory industry with tremendous development potential',[119] there were certainly grounds for thinking there might be considerable 'development potential' in woodchip industries, as outlined in an official 'position paper' of early 1968.[120] Although the paper included a number of qualifications both regarding the possible extent of the resource (particularly since the annual report of the Forestry Branch for that year commented, 'The forest resources of the Northern Territory are comparatively unknown') and regarding the suitability

of the various species for paper-making, it reported that 'each of these areas [seven feasibility areas into which the northern coastal region had been divided] is thought, on the basis of present limited knowledge, capable of sustaining an annual production of 500,000 tons of green wood, that is an industry of the size proposed at Eden' (the woodchip project at Eden in south-east New South Wales then being something of a measure for such projects in Australia). There was very limited mention of some of the:

> formidable technical problems confronting woodchip production in the Territory such as low wood volumes and high defect per hectare, debarking difficulties, the presence of large amounts of charcoal, problems in logging posed by the wet season, high haulage costs due to the dissected northern coastline, probable difficulties in regenerating areas due to the nature of the species regenerative mechanisms and fire influence [and] the high cost of suitable labour[121]

which some other people regarded as critical constraints. Licences were taken up by a number of organisations to study the feasibility of a woodchip industry in several of the areas, but no subsequent proposals were reported.

But whatever the public mood, or the qualifications that might have been placed on estimates that the population of Darwin would rise from 35,000 in 1970 'to more than 100,000 by 1980',[122] the Government in 1970 approved a five-year ('third') program for the Forestry Branch with the aims:

> (i) The development of timber production to meet the requirements of an expanding population and a potential export market (ii) The reservation of potentially productive forest land and the recognition of productive forest land within Aboriginal Reserves (iii) The development, management and protection of forest lands within Aboriginal Reserves (iv) The establishment of forest and timber industries based on sustained yield management of Territory forest (v) The conservation of forest land for timber production and other forest values including soil, water, wildlife and recreation (vi) The creation of employment and training opportunities for Aboriginals in rural areas.

The government also approved an expansion of the Forestry Branch to implement this program.[123]

From late 1968, doubts began to be expressed by some members of the Branch and Research Station staff concerning the validity of the assumptions of cypress pine growth rates on which the expanded plantation program was largely premised, but these doubts were neither shared nor accepted by the Branch. During the next few years, further doubts were expressed by these staff members about the extent and rate of expansion of the activities of the Branch, about

statements of the forest resources and their potential, the likely demand for wood by the Territory and the possibility of it being supplied internally, and about a switch from cypress pine to Caribbean pine which seemed not to be backed by adequate experience with the species. Estimates supplied by the Branch to the first session of the FORWOOD Conference in April 1974 through the report of the Resources Panel were questioned, on the grounds of their being over-optimistic, by a growing body of critics within the staff of both the Branch and Station, who unsuccessfully requested corrections be made to them. An appeal by the Northern Territory Branch of the Insitute of Foresters to the Australian Capital Territory Branch to intervene on its behalf was also unsuccessful in having the estimates revised. At the reconvened session of FORWOOD, the Chairman of the Executive referred to the intervention, explained that the arrangements to allow redrafting of the Development Plan between the two sessions had not included revision of panel reports and estimates, and suggested that, since the recommendations to be proposed to the conference included one for the establishment of a Forest Resources Committee, such a committee would no doubt take the present criticisms of the Northern Territory estimates into account in its future national assessments.

On 25 December 1974, Darwin and the surrounding region was struck by a tropical cyclone of unusual intensity code-named 'Tracy'. A number of people were killed and a number were injured. Many people were evacuated, some to return later, and some not. There was widespread structural damage but, except for glasshouses, the buildings and equipment of the research station suffered relatively minor damage. Damage to vegetation was particularly severe. In the weeks immediately following the cyclone, a survey was carried out, under the direction of the Regional Research Station, into the type and suspected cause of damage to garden trees in Darwin which was to be very useful in the subsequent reconstruction of the city. A cooperative survey of the damage to the native forest and the plantations in the region was carried out by several Commonwealth and Territory organisations.

With the re-identification of the Forest Research Institute as the CSIRO Division of Forest Research in July 1975, the staff and resources of the Darwin Regional Research Station were gradually allocated elsewhere.

A Parliamentary Inquiry

In June 1978, the Standing Committee on Expenditure presented to the House of Representatives a report on *The Northern Territory Forestry Program.*[124] The inquiry, from which the report resulted, had originated, according to the committee,[125] from a submission concerning the management and viability of the government forestry pro-

gram by one of the forestry research staff in Darwin who had made criticisms of the program to the House of Representatives Standing Committee on Environment and Conservation while it was conducting preliminary studies for a possible inquiry into arid-zone forestry in the Territory in 1977. This committee referred the matter of forestry in the Territory to the Committee on Expenditure, which, in April 1978, after examining the answers to a detailed questionnaire which it had submitted to the Department of the Northern Territory on the past and present operations of the forestry program, appointed a sub-committee to conduct a formal inquiry. It was hoped that this sub-committee would report before 1 July 1978, when the Territory was to obtain self-government and the responsibility for the administration of the forestry program would be transferred to the new executive.

In its report, the standing Committee on Expenditure said that it:

> was left with the impression of a program with predominantly the social functions of providing employment and training for Aboriginals drifting over the years into a substantial routine production program without sufficient regard ... [for] adequate research, ... realistic resource surveys, ... benefit-cost analyses, [and] market surveys ...

The committee criticised the resource statistics which had been submitted to FORWOOD, and found that whereas the evidence confirmed Bateman's estimates of an originally meagre and now exhausted commercial resource, the forestry service had expanded as if there were large natural resources to exploit and develop with a practical performance limited to a small plantation establishment plus an injection of a forestry element into the social service of a few Aboriginal centres, neither performance being very successful. The committee also expressed concern at its difficulty in obtaining accurate total figures for expenditure on the forestry program. It questioned the wisdom of the program for training Aboriginal people, and the lack of appropriate involvement of the Aboriginal people in formulating the forestry program, particularly since virtually all of what were considered potential resources were on Aboriginal reserves. It believed that, despite the fact that changing attitudes of the Aboriginal people towards an involvement in forestry contributed to the failure of the program, the real problem lay in unrealistic goals. It also expressed concern at evidence which suggested that criticism of the program by officers within the organisation had been ignored or suppressed. The committee's views on the policy objectives were that, however desirable their achievement might be, they were unrealistically ambitious and based on misleading advice regarding the native forest resource and the plantation potential. While a policy of self-sufficiency in wood was acceptable in principle, there was no

evidence to show it to be economically feasible. In considering a future forestry program, it should be asked whether it was really necessary for the Territory to become self-sufficient in wood production and, if so, whether the Territory Government was prepared to commit the substantial funds necessary in an attempt to achieve this over a long time, particularly in view of the extra risks due to fires, termites and cyclones. In brief, the committee's recommendations were for:

> a virtual cessation of forestry activities in the Northern Territory as they are now practised . . . the planting of softwoods should be halted immediately pending the results of at least 10 years of useful research into the prospects of some success in planting programs . . . [and] the extensive program of maintenance of the native forests [should] be discontinued.

The formal list of recommendations in the report of the inquiry was prefaced with the comment 'The Northern Territory forestry program(s) continued for almost 20 years without adequate scrutiny by the Parliament . . .'.

As a result of the Standing Committee's report, the then Minister for the Northern Territory obtained the services of P. J. Hawkins and J. J. Reilly of the Queensland Department of Forestry to carry out a 'technical evaluation of the softwood planting program undertaken by the Forestry Branch of the Department of the Northern Territory since 1959' and to advise on 'the possible future role of any forestry organisation'.[126] In this evaluation, they were in agreement with the Standing Committee in respect of some matters; in other matters they disagreed. Whereas the Committee had pointed to 'a dearth of useful research' over the years, Hawkins and Reilly saw much useful work but found the results not well documented nor effectively implemented because of conflicts in this regard between the two separate organisations set up in 1967. Rather than complete cessation of the softwood planting program, they recommended its continuation on Melville Island, where they thought the risk of fire, cyclones and termites could be held at an acceptable level, and they recommended the continued management of the indigenous forest at Murganella. While accepting the general view that the estimation of the indigenous forest resource was quite unsatisfactory, they drew attention to the difficulties of establishing satisfactory criteria of 'merchantability' in the case of trees of the kind and condition characteristic of the Territory, and to the further difficulties of assessing trees using those criteria, and they suggested that these difficulties appeared to have made a major contribution to the variation in the estimates. They pointed out that they were in no position to take account of the social and political influences on the program.

A year after the committee's report had been presented to Parliament, the Minister for Home Affairs, who was responsible for the Northern Territory at the time of the inquiry, briefly responded in Parliament to the effect that the two reports would be valuable to the Northern Territory Government (which had assumed office on 1 July 1978) in formulating its future forestry policies.

World War II (1939–45)*

The European Theatre

After the declaration of war between Great Britain and Germany in September 1939, a British Expeditionary Force (BEF) was sent to France to assist in its defence. The needs of the BEF for wood could not be met from Britain: almost wholly dependent on a continuous flow of imports in normal times, stocks were already low and future supplies were unlikely because what shipping was available would be needed for other purposes. Nor could the needs of the BEF for wood be readily met within France, which was also a substantial importer, particularly owing to the depletion of its forests in World War I twenty-five years earlier. The French authorities therefore agreed that a number of British and Dominion military forestry units should be brought to France to harvest the French forests to help meet both French and BEF requirements, but they requested that these units be commanded by qualified foresters who had an understanding of, and sympathy with, French silvicultural systems and methods of management in the hope of avoiding a repetition of the wasteful cutting and unnecessary damage attributed to the Allied forestry companies of World War I. With the alignment of the Dominions on the side of Great Britain in the war, Canada, Australia and New Zealand were asked by the British War Office in November 1939 if they would provide forestry units for this purpose, and it was arranged that Canada provide twenty companies and that Australia, New Zealand and Britain provide three companies each. Action was taken in January 1940 by the Australian Government to raise two of the three companies. Recruiting for the 2/1 Australian Forestry Coy., Royal Australian Engineers, Australian Imperial Force, began, and C. R. Cole (of the Australian Capital Territory) was appointed commanding officer. Recruiting for the 2/2 Coy. followed in April 1940, with A. L. Benallack (of Victoria) in command. The two companies left Sydney

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* I have refreshed and enhanced my personal knowledge of the events of this period by reference to A. M. Lloyd, The operations of Military Forestry Units in France and Great Britain, 1939–44, *Empire Forestry Journal, 23*, 1944, 10–19; Russell Meiggs, *Home Timber Production*, Lockwood & Son, London, 1949, pp. 68–80; Gavin Long, *To Benghazi*, Australian War Memorial, Canberra, 1952, pp. 310–11; files and war diaries held by the Australian War Memorial, Canberra; and a draft report by R. F. Turnbull, Timber control in Australia during World War II, 1939–45, Commonwealth Archives, reference series A3130, n.d.

for France in May 1940 via New Zealand to work in the maritime pine forests of the Landes near Bordeaux. France fell to the Germans in June 1940, the one British forestry company which had arrived in France in December 1939 having to evacuate to Britain along with the rest of the BEF. The Australian companies were still on the water at this stage and were diverted to England, arriving at Liverpool in July.

Britain now had to rely on its own forest resource for its wood needs, and the Ministry of Supply, which was responsible for home timber production, asked the War Office for the help of the military forestry units until they were required again for overseas service. One New Zealand company had arrived on the day of the French–German Armistice; the other two companies arrived in November 1940. Two more British companies were raised in the summer of 1940. Twenty Canadian companies arrived in the winter of 1940–41, and a further ten during 1942. The Canadian companies were allocated to coniferous forests in Scotland, and the British and New Zealand companies to hardwoods in various forests over the country. After a short period of military training, the two Australian companies moved to Northumberland, where a large area of coniferous forest had been acquired. Whereas the Canadian Forestry Corps, as a self-contained specialist corps of the Canadian Forces, brought logging equipment and sawmill machinery with them, the Australian and New Zealand companies had to be equipped in Britain. Equipment was in short supply and was not what they had been used to. Until crawler-tractors were available, converted agricultural tractors had to serve for logging operations. Some light railway tracks were established in level country. An extremely cold wet winter in Northumberland in early 1941 hampered production considerably and caused a lot of illness.

The administrative structure of the various national units followed a similar pattern, with three to six companies being organised into a 'Group'. An Australian Forestry Group was formed in July 1941, with headquarters at Newcastle, under the command of C. R. Cole, who transferred from 2/1 Coy., his place as O/C being taken by J. Thomas. Reinforcements for the Group arrived at the end of the month from Australia, along with the 2/3 Coy., under the command of M. A. Rankin, which took over from the 2/1 Coy. in Northumberland. In February 1942, 2/3 Coy. joined the other two companies which had moved to Dumfriesshire in July 1941, the Group Headquarters having been established at Dumfries. With a wider range of equipment available, there was considerable variation in the design of the group's mills. In Northumberland, 2/1 and 2/2 Coys were assisted by part of an Alien Pioneer Coy. recruited from refugees from the large cities of Western Europe. When the group moved to Scotland, 2/2 Coy. continued to draw unskilled labour from the Pioneers, but 2/1 and 2/3 Coys had assistance from a British Headquarters Unit and Italian prisoners-of-war.

By the end of 1942, the Australian Group had almost worked out its softwood area in Scotland, and in April-May 1943 2/2 and 2/3 Coys began to move to an Advance Headquarters, which had been established in a hardwood area in Sussex, leaving 2/1 Coy. to finish operations in Scotland and to move south later in the year. However, at the end of July they were ordered to leave Britain for New Guinea. Group Headquarters and 2/2 and 2/3 Coys left England in September, and 2/1 Coy. followed in November. In the three years in Britain, the Australian Group had produced about 70,000 cubic metres of sawn timber plus substantial quantities of other wood products such as mining timber. Although their main function was as Engineer Units to supply round and sawn timber to an expeditionary force in the field, as Line of Communication Units they had to be prepared for combat. To that end, they underwent training at regular intervals and 2/1 and 2/2 Coys were allotted a part in the defence of coastal Britain in the critical period of 1940 after the fall of France.

The Pacific Theatre

In July 1943, a conference, convened to consider the utilisation of the forest resources of Papua–New Guinea to meet the requirements of the Allied Forces in the area, recommended to the Commonwealth Government that a central timber control be set up to do this, and that any timber surplus to the needs of the services be sent to Australia. As a result, the Engineer-in-Chief of the Australian Forces was instructed to raise a New Guinea Forest Service, within the Royal Australian Engineers, composed of a Headquarters Unit and three or more Survey (reconnaissance) Units to perform in New Guinea those functions normally carried out by a civil forestry department. Its duties were outlined as (i) the implementation of forest policy as determined by the Commander-in-Chief; (ii) prior allocation and survey, as far as operational conditions permitted, of areas to be milled by all Australian Army sawmilling units; (iii) the compilation of information on milling necessary for compensation purposes; (iv) liaison with the United States of America Forces to bring all timber production in New Guinea under a common policy and to obtain records necessary for reverse lend-lease adjustments; (v) liaison with the Australian New Guinea Administration Unit (ANGAU) on civil rights; (vi) the undertaking of surveys to provide the maximum forestry information; and (vii) correlation and maintenance of forestry information and records in a manner such that they could be handed over to a civil service at an appropriate time. It was intended as part of the plan that the Forestry Coys, which had been ordered to leave England for New Guinea, would form a mobile Australian Imperial Force group to produce timber there by milling along lines compatible with the policy of this Forest Service.

The raising of 1 Command Royal Engineers (New Guinea Forests) as the Headquarters unit, with J. B. McAdam (head of the pre-war New Guinea Forest Service) as commanding officer, 1 Australian Forestry Survey Coy., with W. R. Suttie (Queensland) in command, and 2 Australian Forestry Survey Coy., with A. E. Head (Victoria) in command, began in January 1944, and these units were in a position to function in May. Their major tasks were the location of supplies of timber for immediate operational requirements of the various war services, and an assessment of the forest resources of the south-west Pacific area, for both operational and post-war purposes, to the extent that available transport, communications and enemy occupation permitted. In this, considerable use was made of air-photo interpretation supported by ground reconnaissance and sampling. The units were gradually phased out towards the end of 1945, after the war in the south-west Pacific had ended.

After their embarkation from England, the Group HQ, 2/2 and 2/3 Forestry Coys returned to Australia via the United States, where, with the New Zealand Forestry Coys, they carried out a noteworthy parade down Broadway, New York. After some months in Australia for re-fitting, training, etc. the HQ, 2/2 and 2/3 Coys moved to New Guinea in May 1944, being followed in April 1945 by 2/1 Coy., which spent the intervening period milling in the Northern Territory. The forestry companies carried out sawmilling in numerous places in the south-west Pacific area and, like the forest survey companies, were gradually phased out towards the end of 1945.

Timber Control in Australia

With a war situation developing in Europe, the Department of Supply and Development became concerned at the effects on essential industries in Australia of a reduction in the traditional imports of materials. This included wood and wood products, of which at that time about a third of Australia's total consumption was imported. The Department was instrumental in calling a conference in Melbourne in September 1939 to consider what the most essential imported timbers were and what could be done about replacing them locally if conditions demanded it. After reports from each state on its supply situation, the conference recommended that a timber advisory body be set up composed of state committees, a central committee of state representatives and a small executive to liaise with the Department of Supply and Development.

By early 1940, with the participation of Australian Forces in the European theatre, the need for coordination of demand and supply of timber was clear, and in August the government decided to control timber through an Assistant Controller operating under the Directorate of Materials Supply. This position was filled by I. H. Boas, then Chief of CSIR Division of Forest Products, the services of which it was

intended would be available to him. The Division was admirably suited to this purpose, having already established itself as an authority on the uses of Australian woods generally, on Australian substitutes for imported woods, and on plant and machinery in the wood treatment and wood conversion industries. It had also interested itself in the modification of service specifications and with the establishment and inspection of standards. To assist Boas, a central Timber Advisory Panel and small panels of advisors in each state were appointed. Immediately, efforts were made to assist contractors in meeting defence requirements, to circularise information about the uses of woods available in Australia and to exert some control over the supply of those timbers with particularly valuable uses.

By 1941, as cooperation developed, as the all-round advantages of coordination became evident and as rapidly increasing demand promised to tax Australian supply severely, the need for a full-time officer to mobilise and control supplies was clear. S. L. Kessell, then Conservator of Forests, Western Australia, was appointed Controller of Timber in May 1941 within the Ministry of Munitions, with an office in Melbourne, Boas continuing as Assistant Controller. In June, Liaison officers were appointed — C. J. J. Watson in Queensland and J. M. Gosper in New South Wales. In July, Timber Control was established as a distinct part of the Ministry of Munitions with its own staff, and the formal nexus with CSIR was broken.

While the cooperation of the industry in the supply and use of wood compatible with the national emergency was readily forthcoming and was to be a feature of the situation throughout, the powers of the Controller needed legislative backing and a Control of Timber Order became effective on 1 October 1941 under the National Security Regulations. Under its powers, timber supply priority certificates were issued to contractors considered worthy of sponsorship, which required the supplier to give priority in production and delivery. As special needs arose, further Orders were made. One on 1 January 1942 restricted the use of Victorian or South Australian grown pine to Commonwealth Government contracts, and one on 28 January 1942 restricted the use of high-quality coachwood to the manufacture of plywood for aircraft.

With the entry of Japan and the USA into the war in December 1941, Australia's role was extended from that of a supply base for men and materials to the European theatre to that of a supply base for its own and US Forces in the Pacific area. It also quickly became a potential (and, to a small extent, an actual) theatre of war itself. The demand for wood by the fighting services and for home defence rapidly overtook industry's capacity to supply it, and the limited lines of transport posed considerable problems of distribution. Increases in staff in the Timber Control head office became necessary and Deputy Controllers were appointed for New South Wales (E. L. S. Hudson),

Victoria (L. T. Strahan) and Queensland (A. H. Crane), with Liaison Officers in South Australia (G. J. Rodger), Western Australia (H. V. Telfer) and Tasmania (F. A. Noar). The liaison positions were converted to Deputy Controllers in 1943. Wider and more direct powers than were available under the Timber Control Orders were conferred on the Timber Controller to 'control the production, treatment, handling, sale, supply, movement, distribution, storage, marketing and use of timber' by National Security (Timber Control) Regulations gazetted on 23 March 1942, and further Timber Control Orders were promulgated as special needs arose.

With the intensification of the Pacific war, the timber industry had unprecedented pressures placed on it to meet supply against a background of mounting deficiencies in manpower, materials and transport. The prior demands of the armed services, the munitions industry and other competitive sources of employment seriously reduced the timber industry work-force, which relies on men of particular skills. In 1942, it was declared a Protected Industry, but this did little in practice to relieve the labour situation. Hand tools, sawmilling machinery, snigging and logging transport were normally imported and thus were always in short supply. There was also competitive demand from authorities such as the Allied Works Council, which coordinated a huge program of works over a very large area of the country, often in very difficult conditions, shifting north from Victoria through New South Wales to Queensland as the focus of war shifted further north in the Pacific and putting further pressure on the limited and long lines of communication.

Petrol, oil and other fuels were strictly rationed, and many operators were forced to install charcoal gas-producer units on their vehicles. Tyres were also in short supply. The railways system in Australia, with its different gauges and predominantly single lines, was ill-equipped to meet the demands which were inevitably placed on it and was too heavily taxed with the movement of people and materials of war to continue as the main source of transport of timber. Coastal shipping, which had been responsible for the movement of a quarter of Australia's pre-war production, was also heavily in demand for other services. It was natural that industry should look to Timber Control for assistance in solving all these problems, and matters of manpower, tools, machinery and transport became an important part of the activities of its staff. Because of the fragmented nature of the industry, the cooperation of trade associations of sawmillers, agents and merchants in matching supply and demand was essential and executives and members of these organisations provided a background service in this regard without which the task of Timber Control would have been impossible.

Consumption pre-war was of the order of 3 million cubic metres. A third of this was imported, mainly from Canada. The reduction in

available shipping and the need to conserve Canadian dollar currency prompted the introduction of Import Licensing Regulations, and by 1942–43 imports were reduced to a tenth of the pre-war figure. The traditional method of private importing gave way to an arrangement whereby the Canadian Controller of Timber allotted a ration to Australia for purchase based on the Australian Timber Controller's forecast of requirements and, on its arrival in Australia, this was parcelled out to merchants with controlled selling rights. An arrangement whereby timber was imported from the USA and distributed to US armed services after processing in Australia was also organised by Timber Control. Export of timber from Australia was prohibited after October 1941 except by licence, the application for which was referred to Timber Control. Despite its problems in meeting its own needs, Australia was able to export some timbers to South Africa and to the Middle East for military purposes, and an exchange of Australian hardwoods for New Zealand softwoods was effected. Despite the many problems, local production was increased from 2 million cubic metres in 1938–39 to about 2,500,000 cubic metres in 1941–42, when the demand was at its height, and then maintained at about 2,250,000 cubic metres from then until 1944–45. There was a wide range of uses; for example constructional timbers for service buildings and operations, wood for the manufacture of munition boxes, rifle stock, small craft, bridges, aircraft, tent poles and pegs, pallets, furniture and battery separators, and cases for food, clothing and equipment.

The building industry was the largest consumer pre-war and was in a flourishing condition catching up after the effects of the economic depression of the early 1930s when the European war broke out. As the war worsened, increasing restrictions on civilian building were imposed, until by mid-1942 it was almost totally prohibited. As the war appeared to be nearing an end, Timber Control was active on numerous inter-departmental committees which were looking at problems of post-war development. One of the largest of these was civilian housing, in which it was clear that Commonwealth and State Governments would have to be organisationally and financially involved in a major way and, at the end of the war, when a number of the staff of Timber Control returned to pre-war duties, the remainder were transferred to the Department of Works and Housing.

One of the most important jobs of Timber Control from the beginning was the collection of information on sources of raw material, sawmill and processing plant capacities, stocks available, and so on. This information was an invaluable aid to post-war planning and formed the statistical basis of the subsequent Division of Imports, Exports, Statistics and Programming of the Forestry and Timber Bureau. At its maximum, staff on Timber Control comprised thirty-six in Central Administration, thirty-seven in New South Wales, ten in Victoria, eighteen in Queensland, four in South

Australia, seven in Western Australia and five in Tasmania. During its five years of existence, it played a major role in the organisation of production, distribution and utilisation of a very important material of war.

CHAPTER 8

The Commonwealth and the States

Introduction

The attitudes of the governments of the several states of Australia to the government of the political federation that they formed at the beginning of this century might be fairly described as ambivalent. At one time fiercely parochial, at another arguing strongly for assistance; at one time suspicious of encroachment on State rights, at another arguing for collective consideration as a more effective way to achieve a particular goal. The heads of the State Government forest services have to a large extent mirrored this ambivalence in their attitudes to the role of the Commonwealth in forestry. On the one hand, they naturally reflect the attitudes of their political masters, and the size of the country, the differences in forest types, the varying demands for the values and products of the forest, and the different historical development of attitudes and habits demonstrably give a unique quality to each state. On the other hand, they have always recognised that many of their situations and problems are common to them all. With the increasing influence and control of the Commonwealth government over the finances of the nation, over processing and manufacture within the country, and over trade with other nations, the state forest services have increasingly recognised the need for a national outlook, and for communication and interaction with each other to establish it, in many aspects of the provision and marketing of raw materials and wood products. This was clearly shown at the seven interstate forestry conferences held from 1911 to 1924, and many of the problems which arose during the following twenty-five years before the next conference was held are traceable to the lack of communication resulting from the personal antagonisms which characterised those times.

After World War II a greater sense of federalism prevailed. This was furthered in the case of forestry by better personal relations between the heads of State and Commonwealth instrumentalities and by the expanded role of the Forestry and Timber Bureau. Improved estimates of their forest resources by the state services, and their collation for a national picture in the 1950s, also pointed to the need for a concerted look at the problem of meeting future demand for an

expanding population, and there was common agreement that an expanded coniferous plantation program was a necessary contribution to solving this. Such a program needed money, preferably the guarantee of continued long-term finance, and, since the Commonwealth had become the major collector, holder and distributor of funds for the nation, the Commonwealth Government was the obvious source of this finance. The effectiveness of the role of the Commonwealth, which had traditionally been restricted largely to education and research, was also at this time under formal review by inter-departmental committees. The Commonwealth Government of the period, so firmly entrenched that it could afford to look beyond the political mechanics of survival to ideas and ideals, had also responded sympathetically to suggestions for its role in forestry made by the Institute of Foresters after its national conference in Canberra in 1958.

The Australian Forestry Council

Establishment

It was against this background that, after considerable scouting amongst State and Commonwealth political, forestry and forest-based industry representatives, the Commonwealth Government announced in April 1961 that:

> An Australian Forestry Council will be created under the Forestry and Timber Bureau Act to serve as a National Advisory body on forestry matters. The advice of the Council will be used by the Bureau to ensure that its work is co-ordinated with related activities in the Forest Services of the Australian States and Territories, in CSIRO, in the Universities, and in the Timber Industry. The final composition of the Council will require further consideration but it will contain representatives of the Forest Services of the Australian States and Territories, the Timber Industry, CSIRO, the Universities, and, if considered desirable, other appropriate organisations.[1]

The 'further consideration' was to take three years, for it proved difficult to get the approval of all the States for the representation envisaged in the Minister's statement.

To seek to include such a wide representation of interests in the deliberations of the Council was sensible. It would strengthen the Council's recommendations. To an increasing body of private timber growers, the inclusion of one of their number on the Council also seemed reasonable. As well, the inclusion of a representative of the Institute of Foresters was thought by many of its members to be necessary to reflect the informed opinion of the professional forester. But such a wide representation did pose a problem, one common to any organisation involved in discussing the policies of governments.

Difficulties can arise, or can be feared to arise, if such discussions are not confined to representatives responsible only to the governments concerned, and the approval of all the State Governments was finally obtained only for a government-based Council, along similar lines to the Agricultural Council formed in 1934 (which had specifically excluded forestry from its definition of 'primary production' in delineating its own areas of concern).[2] In July 1964, the Prime Minister announced the agreement of:

> all Australian Governments to set up an Australian Forestry Council as a national advisory body on forestry matters . . . [to] comprise the Minister for National Development as Chairman, the Minister for Territories and the Minister in charge of forests from each State. Provision has been made for Ministers responsible for closely related activities to be co-opted when problems of particular concern to them are under discussion. The Council will be assisted by a Standing Committee of Commonwealth and State officers.[3]

Structure, Objectives, Functions

The objectives and functions of the Forestry Council and its Standing Committee had already been agreed to by the various governments in February 1963:

> The Australian Forestry Council
>
> To promote the welfare and development of Australian forestry
> To arrange mutual exchange of information regarding the production and utilisation of forest products
> To ensure the maintenance and improvement of the quality of forest products and the maintenance of high grade standards
> To formulate and recommend a forestry policy for Australia directed in particular to the development of Australian forests to meet the national requirements for timber and other forest products, both for domestic use and for export
> To promote and co-ordinate research into problems affecting the establishment, development and management of forests and the utilisation of forest products
> To examine methods of obtaining adequate finance for the development of forests
> To consider matters submitted to the Council by the Standing Committee on Forestry
>
> The Standing Committee
>
> To advise the Council on all matters relating to the functions of the Council
> To perform such functions from time to time as deemed necessary by the Council
> To consider any matter referred to it by the Chairman of the Council at the request of any member of the Council.

The Council held its first meeting at Parliament House, Canberra, 21 August 1964, the Secretariat for the Council and the Standing Committee being provided by the Forestry and Timber Bureau.[4]

The inaugural Standing Committee was composed of the Director-General of the Forestry and Timber Bureau, the heads of the state forest services, a representative of the Department of Territories and the Chief of CSIRO Division of Forest Products.

It is an important feature of the Forestry Council that, like its Agricultural counterpart, it is an advisory and not an executive body. Understandably, most of the business of the Council is brought to it by or through the Standing Committee. It deals in discussion, seeks consensus where necessary and possible, and makes recommendations to all or individual governments as appropriate.

Since its establishment, the Council has set up several permanent and ad hoc committees, other than the Standing Committee, to assist it. These include a Joint Committee on Forest Industries, composed of representatives of the Standing Committee, the Australian Timber Producers' Council and the various major conversion industries, the function of which is to consider and recommend on matters of major significance to the future development of forest industries and, once policy on these matters has been approved, to take whatever action is considered necessary; a Joint Committee of Forest Growers, composed of representatives of Standing Committee (as government growers) and the Australian Forest Development Institute (as private growers) to provide liaison between government and private forest owners in the planning and management of forests; and Technical Committees on Forest Fire Control, on the Environment, and on Logging and the Environment. A Forests Pests and Diseases Committee was formed in 1977 to replace the National Sirex Committee and to consider problems associated with the outbreaks of pests and diseases as they arise.

For many years prior to the establishment of the Australian Forestry Council, suggestions had been made within the profession that technical groups should be set up either by the government as a working or advisory arm, or by the Institute of Foresters as consultative committees similar to the technical groups of the Society of American Foresters. A Forest Research Conference had for some time been held at frequent intervals at which representatives of Commonwealth and State organisations attempted to list priorities in forestry research and to arrange programs for maximum efficiency. In 1965 it recommended to Standing Committee that Research Working Groups be set up, and in 1967 the Council approved this with the intention of promoting 'informal, direct contacts and exchange of information between research workers in related fields', the official stated aim being 'by correspondence and meetings as required, to exchange information, review latest developments in its particular field, assist

in the coordination of work, prevent unnecessary duplication, and to point out gaps in present knowledge'.[5] To date, the following Research Working Groups have been formed: Forest Genetics, Mensuration and Management, Soils and Nutrition, Silviculture of Indigenous Forests, Silviculture of Plantations, Fire Management, Forest Pathology, Forest Entomology, Forest Hydrology, Forest Recreation and Harvesting. Recommendations have been made for the formation of further groups concerned with timber engineering, seasoning and preservation.

The Softwood Forestry Agreements

Up to the 1950s, every state and territory in Australia had a program for the establishment of coniferous plantations because of a present or likely future shortage of wood in general and of softwood in particular. The extent of the shortage could only be guessed at. Estimates of the extent and productivity of the native resource were very approximate and governments were reluctant to forecast future levels of population, which the forest services needed as a basis for forecasting future demands. Nevertheless, there promised to be such a deficiency of wood in the future that all the forest services felt that, given the limited area of suitable land and the limited funds likely to be available for a planting program, it was most unlikely that even their maximum efforts would result in an oversupply. The services were also well aware that the benefits of a regular series of forest stand age classes would have to give way to the practical expedient of meeting as much as possible of the apparent future deficiency as soon as possible.

By the end of the 1950s, improving estimates of the native resource and more authoritative information about likely future populations to be catered for made a clearer picture of the target, and the attention of State and Commonwealth Governments to the problem of possible future deficiencies had been obtained. Since the recognised need for a concerted national look at matching wood demand and supply was the major reason for the establishment of the Australian Forestry Council, it was natural that coniferous afforestation had high priority in its early deliberations. By its second meeting in February 1965, the Council had agreed in principle that, subject to five-yearly reviews of the situation, there should be an increase of the annual conifer planting rate for the nation from 16,000 ha to 28,000 ha aiming at a target of about 1.2 million ha by the turn of the century, for a population of about 20 million, assuming an annual per caput consumption of about 1.4 cubic metres. The stated advantages of this accelerated program included replacement of imports (then worth about $200 million a year) and the significant contribution it would make to decentralisation and employment. The State Forestry Ministers pointed out that it was unlikely that their governments would be

able to meet the extra cost out of their own budgets and the Commonwealth Minister offered to approach his government for the appropriate additional finance.

After considerable investigation of the economic suitability of the proposal, the Commonwealth announced in February 1966 that the State Governments would be offered about $20 million in long-term loans over the next five years to lift government planting rates to the target levels of 26,000 ha per year for the next thirty-five years on the understanding that they would maintain their existing programs. At the fourth meeting of the council in March 1966, the States outlined their reaction to this proposal, and in July the Prime Minister made a formal offer of the loans to the Premiers, and the plan began to operate for the 1966 planting season. During 1966 and 1967, several ministerial statements were made on the subject and debates on these statements took place in the House of Representatives and the Senate with almost unanimity of viewpoint. As a result, when the Softwood Forestry Agreements Bill was presented in early May 1967 to legalise the arrangement, the lengthy debates only endorsed the previous general agreement on the proposal and within a few days, with the unqualified blessing of the Opposition,[6] assent was given to the Act.

The essential elements of the Act were simple. For each state, for each of the five years 1967–71, both a 'base year planting' (related to previous performance and the State budget) and the total area proposed for planting that year were fixed. Provided the state planted its base year area 'efficiently and in conformity with sound forestry and financial practices', the Commonwealth would finance the remainder of the proposed total area by way of a thirty-year loan with a ten-year period free of interest or capital repayments, the total loan and interest over the following twenty-five years to be repaid over that period, interest being at the prevailing Commonwealth–State long-term interest rate (usually between 5 and 6 per cent). The position was to be re-examined in 1971. In the mechanics of the scheme, there was no physical separation of State-funded and Commonwealth-funded area. The whole of the year's planting was to be costed at an average rate, and Commonwealth funds were to be provided for planting the extra area over and above the base area in a particular year and also for maintenance of all such area planted since the start of the program.

If the elements of the agreement were simple, the implications of it for forestry were considerable. Not only did each State government endorse its forest service policy on coniferous afforestation but it was prepared to guarantee finance for its implementation several years ahead. This was something the State Governments had never before done for forestry and rarely did for any other State utility. The many arguments and proposals by heads of the state forest services during

the previous fifty years for a national outlook and Commonwealth financial support had at last seen fruition.

The original announcement of the loan proposals by the Commonwealth in February 1966 'envisaged annual planting of 65,000 acres (26,000 ha) by the various governments for the next 35 years and an average of at least 10,000 acres (4000 ha) a year by private forest owners'. This was interpreted in some quarters to imply financial assistance to private growers but, despite considerable discussion by the Council on various means of encouraging private planting and emphasis on the desirability of this by several speakers during parliamentary debates on the subject, no plan for such assistance was formed and the loan proposal was restricted to government planting. However, the Victorian Government had introduced a scheme of long-term loans for this purpose in 1965 and, during the debate on the new Commonwealth proposal in 1966, passed a Land (Plantation Areas) Act which was designed to allow the government to offer long-term leases of crown land to private owners to grow wood. At about the same time, the New South Wales Government introduced a scheme of long-term loans, with generous repayment conditions, for pine and poplar planting on small areas.[7] The past record of private owners provided considerable support for the view that they would continue to play the role envisaged for them in building up the national coniferous estate without much new inducement for, despite very limited encouragement in the past, the non-government coniferous plantation area at that time formed a third of the national total of about 240,000 ha with a contribution of similar proportions to the 1966 planting season total of about 24,000 ha. Nevertheless, it seemed to Council that positive inducement to private owners was a more likely guarantee of their role in the national plan, and late in 1966 it asked its Standing Committee 'to carry out a full investigation of private forestry, its achievements, problems and potential, and possible ways of encouraging its development'.[8] In December 1967, Council decided:

> to ask the Commonwealth Government to consider the introduction of taxation concessions . . . to make forestry a more attractive investment and to authorise the Resources Development Bank and similar Banks to make long term loans at Development Bank interest rates for afforestation projects. The State and Commonwealth Governments are to be asked to consider the deferment of estate and probate duties on forest properties until the trees are harvested.[9]

By early 1969, the Council had decided to recommend an extension of the five-year plan, and by mid-1970 was recommending an expansion of the first program as well. In that year, the planting of the 'millionth acre' in Australia was celebrated — in several localities. In the five years of the first agreement, more than 100,000 ha had been

planted by the government services, involving $18 million of Commonwealth funds. In June 1971 the Commonwealth Government announced it had decided to renew the Act for a further five years, to include the 1971 planting season, and it set about preparing the necessary legislation. This time, unlike 1967, there was to be no easy passage of the Bill, no unanimity of viewpoint in Parliament.

In the previous few years 'the environment' had become a matter of real or professed concern to many people and a proposal for its modification by another 100,000 ha of coniferous plantation was not one which could go unchallenged or at least pass without comment. A portent of what turned out to be probably the longest parliamentary debate on any aspect of forestry in Australia might have been seen when the Leader of the Opposition raised in the House on 31 March 1971 'The Government's delay in acting on recommendations it has received and undertakings it has given to safeguard the environment' as a 'matter of public importance'.[10] The Forestry Council had already shown it was alert to the potential target for criticism which forestry provided and had resolved at its ninth meeting in July 1970 that its 'Standing Committee should study aspects of forestry activities in relation to the maintenance of the quality of the environment and report to the next meeting of the Council'.[11] But the Labor Party (the Opposition) was unwilling to accept this as evidence that the implementation of a further five-year planting program was environmentally unexceptionable and, at the first opportunity (30 May 1972) after the Bill had been given its second reading in the House of Representatives (19 April 1972), it gave notice that, although it did not mean to oppose the Bill, it did intend to move an amendment to the effect that it:

> deplores the Government's failure to prepare and publish in consultation with the States a national plan for full use and development of Australia's forest resources and the conservation of existing hardwood forests and associated flora and fauna in relation to softwood plantings.

In the debate on the amendment, one speaker drew attention to the critical nature of the population projections in the estimated future demand for wood and the plantation program to meet it, suggesting that the projections used were likely to be too high, and, supported by claims from conservation organisations, argued that native forest should not be cleared for coniferous plantations. Although the amendment was defeated in the House, the principles it espoused received further support in the contemporaneous debate in the Senate from the Democratic Labor Party, which, claiming prior political concern for matters of the environment, proposed a further amendment to the Bill.

As a safeguard which might hardly have been thought necessary in the spirit of federalism pervading the Act but was understandable in an agreement of so essentially a business nature, the 1967 Act had contained a clause which read: 'The State shall ensure that planting during each year is carried out efficiently and in conformity with sound forestry and financial practices'. The amendment proposed to add to this:

> The State shall ensure that native forest shall not be cleared for planting softwoods unless the particular proposed clearing has beforehand been the subject of an environmental impact study made by an independent expert on behalf of the Australian Forestry Council and the Council, after considering the report of the said study, has approved the particular clearing.

For the first time, forestry in Australia was to be asked to take formal account of the effect of its operations on the environment through the device of the environmental impact study, which had become fashionable in other parts of the world some years earlier and had already become incorporated in the consideration of other proposals involving large-scale effects on the environment in Australia. Indeed, the debate on the matter must have been partly instrumental in the announcement by the government some three months later that any future Cabinet submission on any proposal relevant to the environment, and any State Government project for which finance was sought from the Commonwealth, must be accompanied by a statement showing the impact the proposal was likely to have on the environment and must be supported by assurances that all the appropriate environmental factors had been considered and evaluated. This requirement had considerable implications for forestry where almost any of its vast range of operations, including the simple felling of an individual tree, might well be considered to have an 'impact on the environment'.

After lengthy debate in the Senate, the Bill was returned to the House on 17 August with the amendment, whereupon the Government moved that the amendment be disagreed with and proposed as an alternative to add to the 1967 wording 'and shall ensure that environmental factors relating to the planting have been considered'. The point having been made by the Opposition parties, the Government having accepted it and the State Governments being amenable to the inclusion of the Government's amendment in the Agreement, this amendment was accepted by Parliament and the Bill was assented to on 18 October 1972. The inclusion was of a minor size, but its implications were of a major kind — 'sound forestry practice' no longer necessarily connoted a consideration of and regard for the effects of that practice on the environment.

The second five-year program did not differ markedly from the first. The base year planting was increased for all states (except South Australia) for a total increase of about 400 ha. The total proposed area for the five years was increased from about 100,000 to about 110,000 ha with equal annual planting instead of a gradual increase as previously. The Commonwealth loan was to increase to about $21 million.

Midway through the second program in 1973, the State Governments were sufficiently agreeable to its purpose and implementation to start moving for a third one. However experience of the legal enactment of the first two programs, in each case a year after their practical inauguration, prompted the Forestry Council to press for enactment of the third program well in advance of the completion of the second and to emphasise the desirability of a longer term for the agreement, such as ten years rather than five, to allow more efficient forward planning. It proposed to postpone recommending a level of planting until the FORWOOD Conference had been held. In 1970, Council had endorsed a suggestion made in 1969 by one of its Technical Committees, the Joint Committee on Forest Industries, that a forestry and wood-based industry development conference be organised, having in mind the success of such a conference in New Zealand, and in 1972 projected it for April 1974. Since the major purpose of this conference was to analyse the wood demand–supply situation and recommend a policy appropriate to it, Council saw FORWOOD as the best source of information from which to decide a level of planting.

By this time, there was considerably more interest in the afforestation program and other forestry projects on the part of people outside the profession and the government departments immediately involved in them than ever before. This was clear from statements made by various individuals and groups to the House of Representatives Select Committee on Wildlife Conservation (set up by the Commonwealth Government in June 1970) and from the recommendations regarding the afforestation program in the committee's 1972 report:

> (a) that serious consideration be given to converting suitable uneconomic previously forested farmland to coniferous forest rather than clearing additional native forest for this purpose
> (b) that before further native forest is cleared for the establishment of coniferous forest surveys be carried out to assess the value of such areas of wildlife conservation.[12]

Most importantly, however, there was a change in December 1972 to a Commonwealth Government which had made 'concern for the environment' a major plank in its pre-election policy. In May 1973, a

Commonwealth inter-departmental committee was set up to investigate both the afforestation program and woodchip operations, which were then attracting critical attention from several quarters. The committee commenced its investigation of the woodchip operations and had not started on afforestation when pressure for a public rather than an intra-government inquiry prompted the government to put the investigation of afforestation into the hands of the House of Representatives Standing Committee on Environment and Conservation in July 1974. The terms of that inquiry were 'The operations of the Softwood Forestry Agreements Acts 1967 and 1972 with particular reference to their environmental, social and economic impact and make appropriate recommendations as to the form of any future Softwood Industry Agreements Legislation'. In May 1973, the Commonwealth Government also set up a National Estate Committee of Inquiry, whose terms of reference included 'the nature and state of the National Estate, the measures which should be adopted, and the role which the Australian Government could play in the preservation and enhancement of the National Estate'.[13]

FORWOOD met in April 1974 to discuss the reports of its specialist panels, their coordinated recommendations and a production development plan, after which it adjourned, to be reconvened in November. When the Council met in the intervening June, it decided to continue to defer negotiations on a further Agreements Act until the final FORWOOD recommendations were available.[14] By that time, the National Estate Committee had presented its report, which included in its recommendations 'that further substantial pine planting, at the expense of native forest, be discontinued until more research has established the effects on the environment of, and the economic justification for, present practices'.[15] To this, and some strongly critical comments about forestry, the Council restricted its reaction to a formal request for advice from the Minister for Urban and Regional Development on 'what steps should be taken to obtain State Government views on the Report'.[16] In a rather more constructive way, the Working Group, set up by the Commonwealth Government in December 1973 to prepare a Green Paper on all aspects of rural policy in Australia, set out to identify the critical economic and environmental issues of the afforestation program and stressed the need for the areas of conflict within these to be cleared up as soon as possible by better information.

Council held its next meeting in August 1975. By then it had accepted FORWOOD's recommendations for a forestry development plan, which included an expanded coniferous afforestation program. By then, too, the report of the House of Representatives Standing Committee on the operation of the 1967 and 1972 Acts had been presented.[17] It had been a thorough inquiry and had provided an opportunity for anyone with a point of view to present it, including

representatives of State and Commonwealth forestry organisations. State Ministers on the Council were not altogether happy with some of the submissions nor with the way they had been accepted or interpreted by the committee. They 'expressed concern at what were considered to be a number of misleading statements, inaccuracies and inconsistencies contained in the body of the Report'.

With regard to the main point of its terms of reference, the committee found there was 'a need for a softwoods planting program, possibly on a lesser scale than that planned at present' and recommended that 'the next Softwood Forestry Agreements legislation should cover a period of 10 years' as the Forestry Council had proposed. It also recommended that 'an immediate study should be carried out by a body such as the Bureau of Agricultural Economics to determine the economic viability of the softwood planting program, on both strict financial grounds and on the broadest possible cost/benefit grounds'. Such an economic evaluation before a third five-year program was negotiated had also been recommended by a task force appointed by the Commonwealth Government in April 1973 to review the continuing expenditure policies of the previous government.[18] Council pointed out that this type of study had been made prior to the passing of both the 1967 and 1972 Acts but nevertheless offered no strong objection to it being done and proposed that the existing Act be extended for a year pending the completion of the study and consideration of a new Act.

As a result of the House of Representatives Standing Committee recommendation, it was arranged that the Bureau of Agricultural Economics would investigate the likely future performance of the Australian forest products industries, and the future demand for forest products in Australia, with particular reference to the softwood industry, and that the Forestry and Timber Bureau would investigate the economics of growing conifers in Australia. Both reports became available to the Council toward the end of 1976. The report of the Bureau of Agricultural Economics recommended a total (public and private) planting for the years 1976–80 of the order of 17,000 ha, which, assuming a continuation of private planting at the recent rate of about 8000 ha, meant a public area of about 9–10,000 ha. Both reports considered it was in Australia's interests to continue with coniferous afforestation.

As a holding measure until further consideration could be given to a long-term program, the government passed the Softwood Forestry Agreements Act 1976, which voted a total of $6 million, which was estimated to allow Commonwealth-financed planting of about 5000 ha, about half the area it had financed under the 1972 Act. By this time, expenditure of Commonwealth funds by the State Governments on such projects required environmental impact statements. Since the Act being assented to in December 1976 referred to planting in

the 1976–77 year, insistence on this requirement would have negated its purpose, and, as a compromise, and also in keeping with the spirit of the House of Representatives Standing Committee's report, the State Governments agreed that as much as possible of the planting for the year would be done on land which had already been cleared for agriculture and that the operational procedures recommended by the Standing Committee (in para. 159 of its report) would be followed. In any future Commonwealth-financed planting, compliance with the requirements of the Environment Protection (Impact of Proposals) Act 1974 would be necessary.

In March 1978, the Commonwealth Government introduced further legislation to assist the afforestation program. In a later study,[19] the Bureau of Agricultural Economics had revised its previous recommendation from an annual total of about 17,000 ha for 1976–80 to about 20,000 ha for the period 1976–90. This total assumed about 12,000 ha would be planted by the states, an amount which, though a slight rise on the previous, continued to be less than the proposals of the previous Agreements and the actual areas planted. On this and other grounds, the government considered that agreements for finance for further planting were not justified for the present. However the government agreed to meet the same proportion of the cost of tending the total area planted under the 1967, 1972 and 1976 Agreements as the area of Commonwealth-financed planting bore to the total area planted. ('Tending' included 'weeding; cleaning; fertilising; non-commercial thinning; coppicing; pruning; protection against disease, pests and fire; and maintaining necessary fencing and roads'.)

The Softwood Forestry Agreements Act 1978[20] provided for this arrangement for five years, finance being limited to $4.2 million in 1977–78 but full costs being met in the subsequent four years. The government had accepted the principle that as much planting as possible should be done on previously cleared land and to this end, though it was not able to finance land purchases in 1977–78 because of immediate financial constraints, it was prepared to review the situation prior to the second year of the period.

The Native Forest

Although its major interest in developing forest products to meet national requirements centred on the coniferous afforestation program, the Australian Forestry Council was concerned, from its earliest meetings, to consider the desirability and feasibility of enhancing production from native forest, and it asked the forest services to report on the area of state forest which would benefit from silvicultural treatment but was not getting it because of a lack of funds. Their findings indicated that the funding required was unlikely to be forthcoming and the states were asked to reduce their nominations to special areas which would show a high return of benefits for

costs. In early 1969, the Council forwarded to the Commonwealth Government proposals for financial support for ten such areas, suggesting loans at low interest rates or of longer interest-free terms than those of the Softwood Agreements or assistance by grants instead of loans. By June 1971, the government had agreed to the proposals being examined by appropriate departments and an inter-departmental committee.

The proposals continued to be held up by lack of finance, and by 1974 the government considered that even fuller economic investigation of them was needed and that, in keeping with the new legislation, environmental impact statements would have to be prepared. Support for more intensive management of the native forests was given by the House of Representatives Standing Committee on Environment and Conservation in its 1975 report on the operation of the Softwood Forestry Agreements Acts, which recommended that 'Immediate consideration should be given to providing financial assistance to the States for the regeneration of hardwood areas in a way that ensures the maintenance of forest diversity and other environmental values'. However, by late 1976, the government advised the Council that financial stringency would not allow special finance for native forest treatment for the time being.

Hardwood Woodchips

In early 1967, Commonwealth and State forestry departments and other relevant departments began to be approached by pulp and paper company representatives from Japan about the possibility of purchasing woodchips. It was clear from past experience with trading in such natural resources that simultaneous negotiations being held by the various States and Territories might, however much these lay in their area of right and responsibility, set up an artificially competitive situation to the detriment of Australia as a whole. Council provided a logical and convenient means of coordinating action, particularly as the Commonwealth Government was responsible for the issue of export licences. Council thus involved itself in a coordinating role from the earliest negotiations, the need for such a role becoming evident in late 1968 when the Commonwealth temporarily declared woodchips and wood for pulping a prohibited export under customs regulations until various problems in negotiations between the Japanese and government and private interests in Australia could be resolved satisfactorily. The Council has continued to interest itself in all appropriate matters to do with the woodchip industry and the export of chips to the present time.

Quarantine

Under the Constitution, the Federal Parliament has the 'power to make laws for the peace, order, and good government of the Common-

wealth with respect to . . . quarantine'. The Quarantine Act 1908 is administered by the Commonwealth Department of Health in relation to human, animal and plant quarantine. In general, the administration of interstate quarantine is left in the hands of the State Governments, the Commonwealth taking action with regard to interstate movements of animals and plants only if it considers action is necessary for the protection of any state. Strict control is exercised by the Commonwealth Government over possible imports of exotic pests and diseases through its powers under the Act relating to the 'exclusion, detection, observation, segregation, isolation, protection and disinfection of vessels, persons, goods, animals and plants to prevent the introduction or spread of diseases or pests affecting man, animals or plants'.

One of the few breaches of the barrier in the field of forestry has been the introduction (in what is thought to be 1947) of *Sirex noctilio*, a wood wasp which attacks and may kill radiata pine trees, in radiata pine pulpwood from New Zealand, where it had become established after being introduced from Europe early in the century. Its presence in Australia was first recorded officially in radiata pine plantations in south-eastern Tasmania in 1952,[21] and research into its control and eradication began immediately. Its discovery in radiata pine stands near Melbourne in late 1961[22] aroused concern that it would spread over the mainland, and a meeting of public and private forestry organisations in early 1962 urged the Commonwealth and State Governments to establish a fund for a program to combat the threat.

The governments responded quickly by forming a National Sirex Fund, to which private growers subsequently contributed, to investigate the extent of the attack, to conduct research into possible methods of control or eradication and to assist in its control or eradication. A National Sirex Fund Committee was appointed to supervise expenditure, the Department of Health administering the fund until 1966, when the Department of National Development assumed this responsibility. Two sub-committees were also appointed, one for research and one for survey and eradication.

From its formation, the committee met frequently to keep the position under constant surveillance, obtained continuing finance to fulfil its functions and, through its sub-committees and implementation of their recommendations, kept *Sirex* in satisfactory check. The administration of the fund by the Department of National Development and the membership of the Ministerial Conference of Sirex, which was also involved, brought the matter into close association with the Forestry Council and in September 1977, a Forest Pest and Diseases Committee of the Council was formed, both to replace the National Sirex Committee and to consider any other problems associated with outbreaks of pests and diseases.

Private Forestry

In its major concern for increasing the future supply of wood by increasing the rate of establishing coniferous plantations, the Forestry Council was aware of the contribution being made to the national total by industrial companies, investment companies and small owners, and it included the question of government encouragement of private forestry in its earliest agenda. During the parliamentary debates on the Softwood Forestry Agreements Acts, speakers from all political parties stressed the need for assistance to private forestry, using the Victorian and New South Wales Government schemes of 1965–66 as examples. In the event, funds under the Act were restricted to the State Governments, and despite continuing sympathetic attention being given to the matter of financial assistance to private owners, particularly as it has assumed a continuing contribution from them to the national coniferous production, the Council has not sought special grants from the Commonwealth for the purpose. Studies have been carried out by Council into the possibilities of assistance or inducement through the taxation structure, but this is a complex field.

Widened Functions

With the increasing interest of the public in forestry and the increasing demands being made by the public on forestry, it was inevitable that more and more issues outside its original, somewhat narrow terms of reference (which emphasised wood production and the well-being of the forest-based industries) would be brought to the attention of the Australian Forestry Council. In 1979, it amended its functions to include consideration of the 'broader social aspects' of forestry.[23]

CHAPTER 9

The Private Sector

The Native Forest

About a fifth of the native forest land of Australia is under freehold or leasehold tenure, and about 25 per cent of the wood supplied from the native forest each year comes from this source. The proportion has been of this order or higher for the last fifty years. It varies from state to state; for example, in Queensland it has been almost 50 per cent for about thirty years. With rare exception, the only part of this supply resulting from deliberate tree culture comes from a comparatively small area owned by individual companies. Practically all of it results from the clearing of land for agricultural purposes or from the sale of an immediate crop of trees with little thought on the part of the owner for the regeneration of another crop. There are several reasons for this. One is that, to 'the man on the land', the native forest has usually presented itself as an impediment to agriculture and not as a potential crop in itself, especially as the native eucalypts in general have a great capacity for survival and growth and their natural regeneration after clearing often provides a continuing impediment to agriculture. Moreover, rotations of native forest species under natural conditions are longer, the financial returns smaller, and the natural and commercial risks greater than is the case with most agricultural crops or with animals.

For a long time, the forest services have regarded the private forest land as a dwindling source of wood supply on the grounds that exploitive cutting without a deliberate attempt at regeneration would eventually run it down. Although the ratio of its contribution to the national total might continue for some time for such reasons as the conversion from leasehold to freehold which has been sponsored by some State Governments in recent years, they have considered that, in the long term, it was an unreliable source of supply and that planning for future production should start with that premise. The alternative, of course, would be a positive approach by the forest sevices to ensure, or at least encourage, the maintenance of the resource. The forest service view has been that money for forestry is always so short that, if it is to be invested in the native forest, it is best invested in those more productive areas managed for and by the

Crown with professional expertise, any government funds specifically for private forestry being better expended on coniferous plantations.

At least, this was the general line of thought until the development of the hardwood woodchip operations in Tasmania stimulated new thinking on the matter. Some of the earlier crown concessions to the pulp and paper companies there made explicit or implicit demands on them to ensure regeneration or at least to ensure that they implemented programs aimed at doing so, but any lack of success in meeting these demands was not of such a nature as to excite much public interest. However, the extent of annual clear-felling operations on both crown and private land (the latter constituting about one-third of the total forested land, and contributing about 25 per cent annual sawlog production and nearly 50 per cent of the pulpwood production) increased considerably with the development of the export woodchip industry. Coming as this did at the same time as the surge of the environmental movement of the late 1960s, it stimulated concern on the part of many people, both in and outside this movement, that, because of the extent of the operations and the small financial return from them, insufficient attention could be given to regeneration on crown land and that private landholders would be unwilling to give appropriate attention to it.

One of the responses to this expression of concern was the appointment by the Tasmanian Government of a Select Committee of the Legislative Council in 1970 to inquire into a number of matters to do with the regeneration of forests on both crown and private land. Although the committee made fairly firm recommendations[1] with regard to the authority, responsibility and practices of the Forestry Commission concerning regeneration, it showed less firmness with regard to private ownership, merely recommending:

> that the regeneration of cut-over areas of private property be kept under review. Should the existence of adequate private forests be threatened, consideration should be given to the establishment of a Private Forests Board or some other body to encourage and assist in the regeneration of forests on private land.

The committee also recommended relief for landholders by way of special probate valuations.

Arising out of this and the continuously expressed concern by many people that private forested land must somehow or other be made subject to forest management, a Board of Inquiry into Private Forest Development in Tasmania was appointed by the government in September 1976. In its report in 1977,[2] the board made a number of recommendations, which included legislation to bring private forests under profitable forms of management, in conjunction with a quota system to regulate the total yield of pulpwood from private land; the

creation of a new Division within the Forestry Commission headed by an additional Assistant Commissioner to promote the development, funding and utilisation of private forestry resources, supported by a council on which private forestry owners, State agencies and wood processors would be represented; and the removal of various existing disincentives and obstacles to proper forestry practices and the promotion of various incentives to proper management.

In December of the same year, the Forestry Act 1977 was enacted. It established a new Division in the Forestry Commission, headed by an Assistant Commissioner and supported by a Private Forestry Council as recommended by the Board of Inquiry, and also a mechanism for financial assistance, to be supervised by the Commission, for management of private forests or utilisation of their produce. The new Division began its operations early in 1978, and the Forestry Council began to interest itself in questions of incentives and disincentives in connection with private management of native forest.

Plantations

Whereas private owners have shown little interest in the formal management of the native forest, their interest in the establishment of plantations began over fifty years ago and has developed to the stage where, by 1977, 25 per cent of the national total of 600,000 ha of plantations was privately owned. Of this, about 90 per cent was of coniferous species (70 per cent of it radiata pine, 20 per cent slash pine) and 10 per cent of native eucalypts and poplars. The proportion of private ownership at that time varied considerably over the country: about 40 per cent in Victoria; 20 per cent in New South Wales; 17 per cent in Queensland; 10 per cent in South Australia; 7 per cent in Western Australia; 6 per cent in Tasmania; and none in the two Territories. By the late 1970s, the private sector was planting an area of the order of 10,000 ha per year and government planning included the assumption that the various motivations on the part of the private sector would continue to operate as far ahead as could be seen and that the private sector would continue to plant at something like that rate.

Afforestation by the private sector falls into four major categories: (i) industrial — subsidiaries of wood processing companies which wish to control at least part of the supply of their raw material for industrial security or for profitability; (ii) investment companies or management companies — companies which offer the public an interest in the results of plantations by bonds, shares, convenants, areas of planted land etc. or which undertake to establish, maintain and utilise plantations for profit to the investors; (iii) institutional or communal — semi-government or statutory authorities or local government councils with plantations on water catchments, church organisations, primary and secondary schools with plots used for

education and minor income; and (iv) individual owners — areas of various size and purpose depending on the owner, often referred to as 'farm forests', 'tree farms' or 'woodlots'. The relative extent of these categories of ownership varies considerably over the states. For example, there is very little industrial ownership in New South Wales, but it represents about three-quarters of the Victorian total. On the other hand, New South Wales has the largest number of investment companies and the largest area of that kind of ownership.

Most of the planting by the industrial companies has been since World War II and now represents more than half the private sector total, more than half of it in Victoria and the bulk of it for the pulp and paper industry. The two major organisations are APM Forests Ltd, which, as well as owning coniferous plantations in southern Australia and in Queensland, has eucalypt plantations in Victoria and New South Wales, and Softwood Holdings, which has coniferous plantations in South Australia and Victoria. Federal Match Co. and Bryant and May have established poplar plantations in northern New South Wales and near Wodonga (Victoria) for their specialty use.

Investment companies began establishing their various types of interest in the late 1920s and the 1930s and their development and public response to it has waxed and waned since then depending on their results, the general economic situation and modifications to the law under which they operate. There are a number of such companies operating in Australia, their structure and history being outlined by G. R. McKenzie Smith.[3]

Institutional plantings represent 1–2 per cent of the total, predominantly in Victoria; and it is difficult to say what percentage is contributed by individual owners. The 'woodlots' do not have to be registered or notified in any way and vary in size from less than a hectare of planting by a farmer in the corner of a paddock to comparatively large areas planted as a form of investment by people whose main source of income is not farming. Estimates suggest that the area under this form of ownership represents 2–3 per cent of the total.

In 1969, a group of plantation and woodlot owners from several states formed the Australian Forest Development Institute (AFDI) to promote the interests of its members and to develop private forestry in Australia. In 1975, the Private Owners Association, which had been founded in 1962 largely by the major industrial pine plantation owners of southern Australia to obtain funds to fight the *Sirex* woodwasp threat there,[4] amalgamated with the AFDI. One of the interests which the AFDI was established to pursue on behalf of its members was assistance in the establishment and maintenance of plantations by the provision of financial incentives and the removal of financial disincentives, and by the supply of technical advice, research results and professional extension.

The major incentive for the industrial and afforestation companies is the taxation benefits which come through general primary-producer concessions and a special concession for forestry projects. Several industrial and investment companies in western and southern Victoria lease crown land under a Lands Plantation Act which was specially introduced by the State Government to encourage the establishment of plantations on land unsuited to agriculture.[5] The Victorian Government has also leased part of an area in the Strzelecki Ranges, which it began to acquire in the 1930s after the failure of agriculture there, to APM Forests Ltd under a special Act of Parliament to support a large planting project which that company had initiated through land purchases in the area. Both the New South Wales and Victorian Governments have initiated schemes of low interest loans for farm woodlots, but these have been of limited appeal to farmers and represent a loss to the forest service plantation establishment since the money for the schemes has to come from general financial allocations to the services rather than being specially budgeted. Within the limits of staff for the purpose, all the forest services encourage extension to assist the private sector. APM Forests Ltd and Softwood Holdings offer advice and sell seedlings at cost to woodlot owners in return for the right of first refusal of all pulpwood and sawlogs in the woodlot.

In 1975, a Joint Committee of Forest Growers, to include representatives from both the public and private growers, was established by the Australian Forestry Council to effect greater liaison between the two sectors. The Private Forestry Council set up by the Forests Act 1977 (Tasmania) has begun a review of incentives and disincentives as they might affect private plantation owners in Tasmania. The AFDI has been instrumental in obtaining better insurance cover for its members and in drawing up a code of practice for investment companies.

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Dr L.T. Carron began his career in forestry with the Queensland Department of Forestry in 1938. After war service in military surveying and forestry in Papua New Guinea and the South-West Pacific, he graduated BScFor, DipFor from the University of Queensland and the Australian Forestry School. He later converted this to an MScFor, gained the DipFor at Oxford University and subsequently a PhD at the Australian National University, where he is a Reader in the Department of Forestry. In 1971 he was elected a Fellow of the Institute of Foresters of Australia, and in 1981 was awarded the N.W. Jolly Medal, the Institute's highest award for merit in forestry, for his outstanding contributions to Australian forestry.

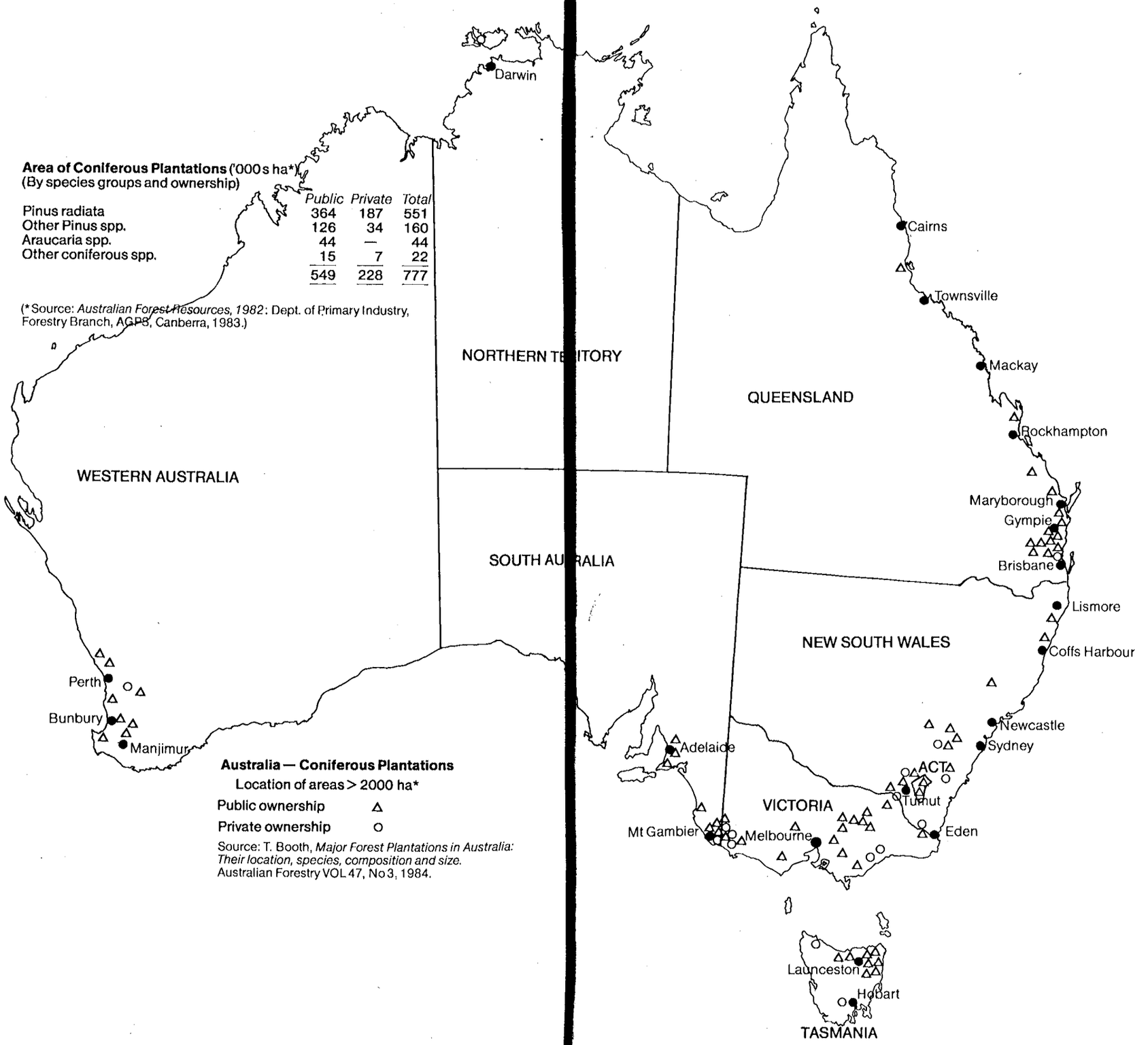
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Area of Coniferous Plantations ('000 s ha*)
(By species groups and ownership)

	Public	*Private*	*Total*
Pinus radiata	364	187	551
Other Pinus spp.	126	34	160
Araucaria spp.	44	—	44
Other coniferous spp.	15	7	22
	549	228	777

(* Source: *Australian Forest Resources, 1982*: Dept. of Primary Industry, Forestry Branch, AGPS, Canberra, 1983.)

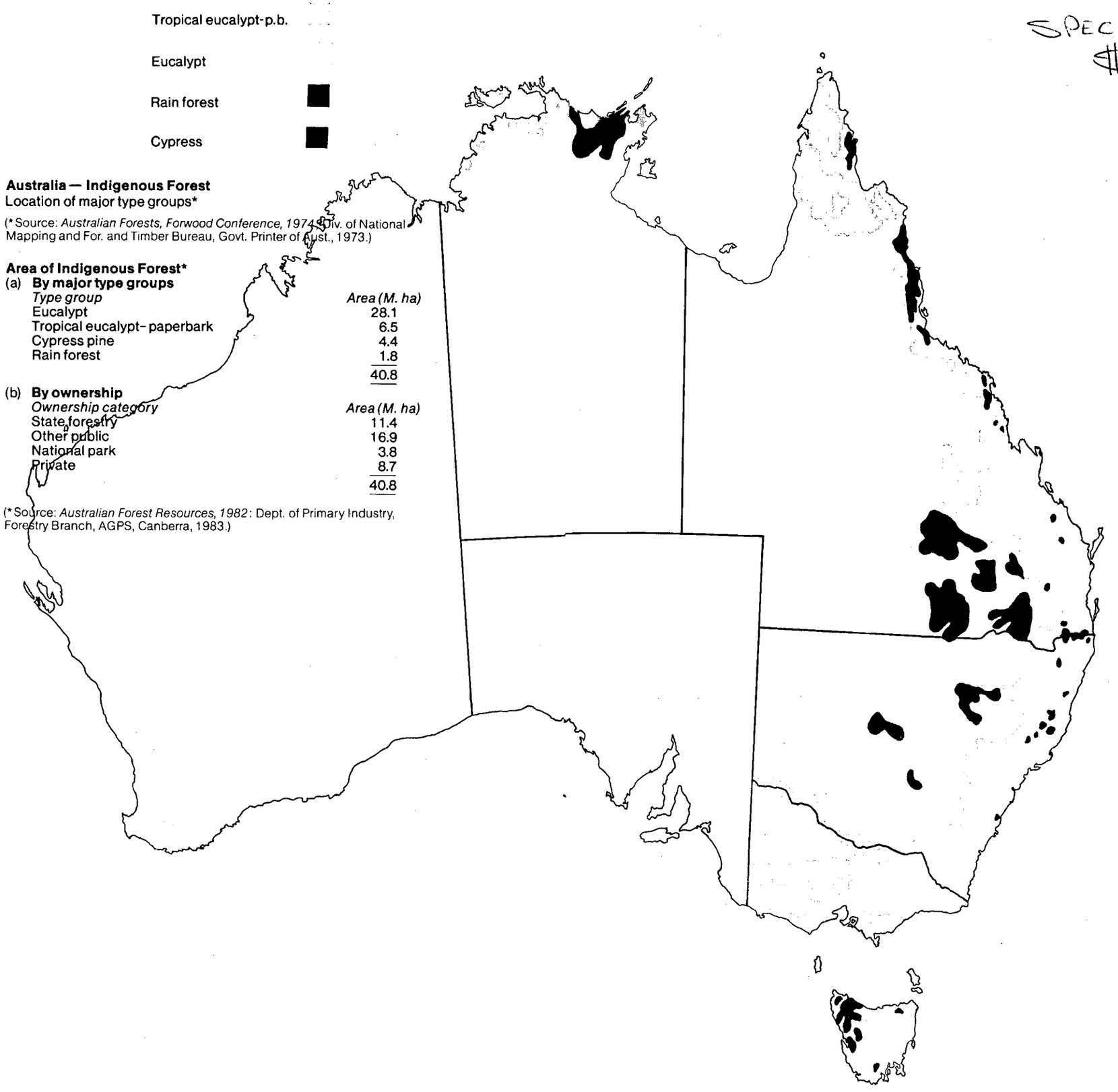


Australia — Coniferous Plantations
Location of areas > 2000 ha*

Public ownership △
Private ownership ○

Source: T. Booth, *Major Forest Plantations in Australia: Their location, species, composition and size.* Australian Forestry VOL 47, No 3, 1984.

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Australia — Indigenous Forest
Location of major type groups*

(* Source: *Australian Forests, Forwood Conference, 1974*, Div. of National Mapping and For. and Timber Bureau, Govt. Printer of Aust., 1973.)

Area of Indigenous Forest*

(a) **By major type groups**

Type group	*Area (M. ha)*
Eucalypt	28.1
Tropical eucalypt- paperbark	6.5
Cypress pine	4.4
Rain forest	1.8
	40.8

(b) **By ownership**

Ownership category	*Area (M. ha)*
State forestry	11.4
Other public	16.9
National park	3.8
Private	8.7
	40.8

(* Source: *Australian Forest Resources, 1982*: Dept. of Primary Industry, Forestry Branch, AGPS, Canberra, 1983.)